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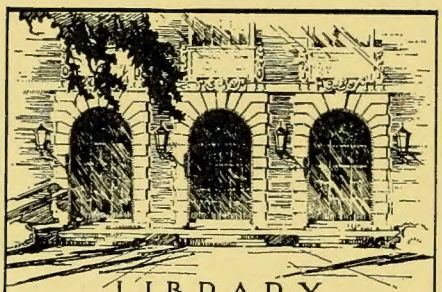

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SPORT FISHING

at Lake Chautauqua, near Havana, Illinois, in 1950 and 1951

William C. Starrett
Perl L. McNeil, Jr.

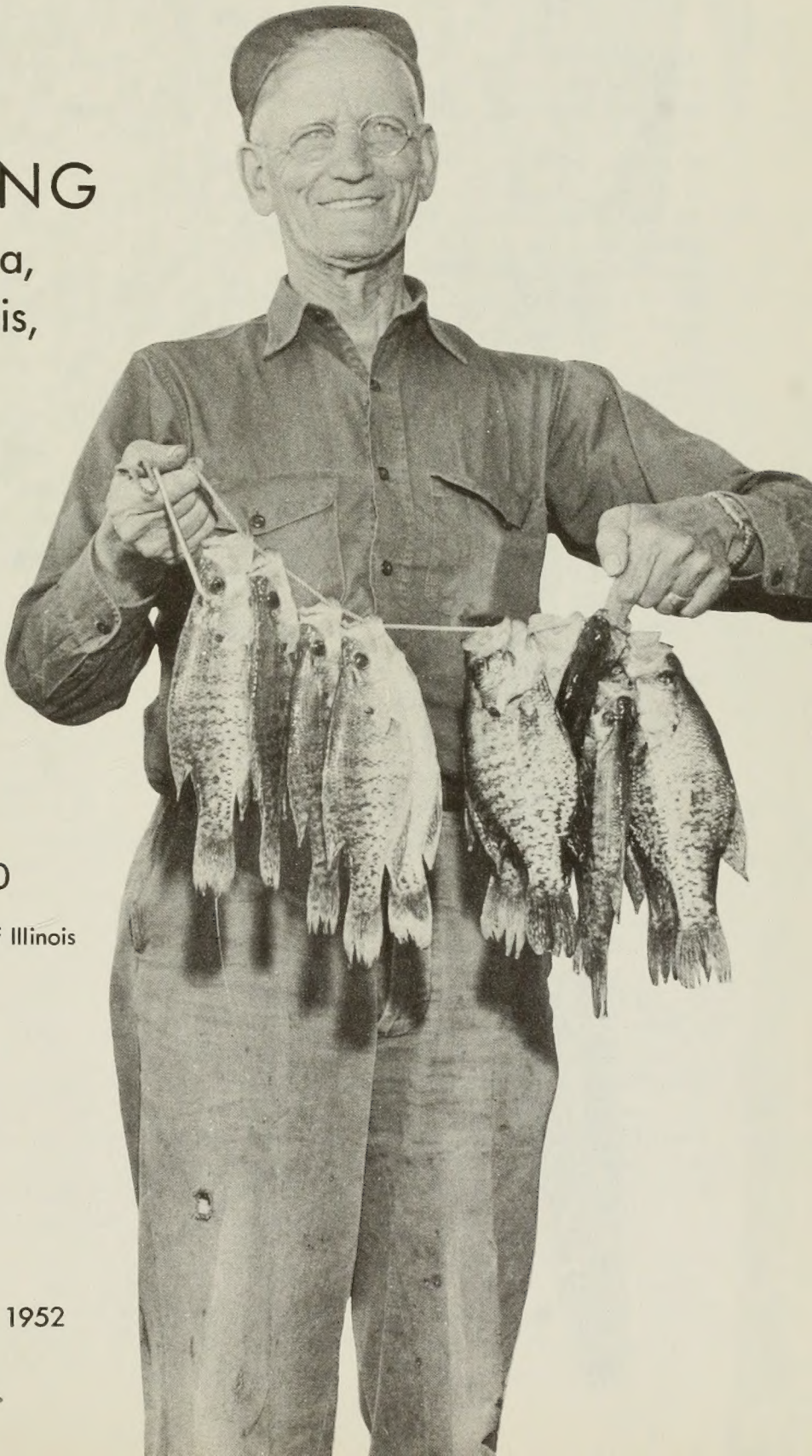

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Fig. 1. -- Aerial view toward southwest from upper end of Lake Chautauqua.

SPORT FISHING

At Lake Chautauqua, Near Havana, Illinois, in 1950 and 1951

William C. Starrett and Perl L. McNeil, Jr.*

Less than 50 years ago the bottomland lakes adjoining the Illinois River were considered among the best sport and commercial fishing waters in this country. These shallow, fertile lakes provided spawning grounds, food, and space for large populations of largemouth black bass, crappies, bluegills, yellow perch, and various other kinds of sport, commercial, and forage fishes.

Between 1900 and 1920 a number of these bottomland lakes were drained and the areas incorporated into drainage districts for agricultural purposes. It was during this period that the Illinois River fishery declined.

Fortunately for Illinois anglers, all of the bottomland lakes were not drained, and some of those that were drained were later restored. We have learned in our research program at Lake Chautauqua, a water area that was drained and later restored, that many anglers do not realize the existing possibilities for good fishing in the Illinois River valley, provided certain fishing techniques are used. In this paper are presented recommended fishing techniques and certain factors we have found that affect sport fishing at Lake Chautauqua.

Characteristics of Lake Chautauqua

Lake Chautauqua, figs. 1 and 2, is a part of the Chautauqua National Wildlife Refuge, which is maintained by the United States Fish and Wildlife Service principally as a migratory waterfowl refuge. Its southernmost end is approximately 4 miles north and east of Havana, in Mason County, Illinois. With many of the characteristics of other bottomland lakes of the area, Lake Chautauqua is a shallow body of water covering 3,562 acres; it has an average depth of about 3.2 feet at normal pool stage. The bottom is chiefly mud but along the east shore are narrow sandy beaches. The lake is 1 to 1½ miles in width and it has little protection against wind. High winds cause it to become quite rough and muddy within a short period.

The area now known as Lake Chautauqua formerly was a series of sloughs and lakes connected with the Illinois River. In 1916 the Chautauqua Drainage and Levee District was organized, and after World War I this organization built surrounding levees and pumped the sloughs and lakes dry. The one-time lake bottoms were then planted to corn. Only in 1924 was a fair crop produced. In the fall of 1926 the district was flooded by the Illinois River, and parts of the levees were washed out. The levees were not repaired by the drainage district organization, and the water levels in the flooded district fluctuated with the Illinois River until 1940.

In late 1936 the United States Biological Survey (predecessor of the Fish and Wildlife Service) purchased the drainage district for use as a migratory waterfowl refuge. By 1940 the federal government had repaired the broken levees and installed spillways and control gates. At low Illinois River stages, the manager of the refuge can maintain a constant pool stage of 435.0 feet (430.0 feet base level). During moderate to high river stages, water levels cannot be controlled, as the lake is then connected with the Illinois River.

For several years previous to 1943, according to Frank C. Bellrose of the Illinois Natural History Survey, aquatic plants were abundant in Lake Chautauqua. A near-record flood occurred in the Illinois River valley in the spring and early summer of 1943. Since this flood, most of the plants have failed to become re-established in the lake.

Flood waters from the Illinois River caused the water levels of the lake to fluctuate considerably through the spring and summer months of 1950 and 1951. The lake was connected with the river for 7½ months in 1951.

In 1950 a silt survey was made of Lake Chautauqua by the Illinois Water Survey (Stall & Melsted 1951). This study revealed that the capacity of the lake for water storage had been reduced by sedimentation 18.3 per cent in 23.75 years. An analysis of Lake Chautauqua sediment deposits indicated that they are quite high in fertility. The excreta from waterfowl are thought to be partly responsible for this fertility.

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*Dr. William C. Starrett is Associate Aquatic Biologist, Illinois Natural History Survey; Perl L. McNeil, Jr., is Fisheries Biologist, Illinois Department of Conservation. Their paper is a report on a co-operative project of the ~~National History Survey~~ and the Department of Conservation.

Natural History Survey

Extent of Fishery Investigation

On April 15, 1950, a co-operative fishery research program was started on Lake Chautauqua by the Illinois Natural History Survey, the Illinois Department of Conservation, and the United States Fish and Wildlife Service.

The purposes of this research program were (1) to determine the values of the sport and commercial fisheries of an Illinois River bottomland lake; (2) to develop management practices that would increase the yield of sport and commercial fishes; (3) to study the biology of the fishes present; and (4) to estimate the dynamics of the fish population.

This paper is a preliminary report based on a study of the sport fishery at Lake Chautauqua from April 15, 1950, to October 25, 1951. While the data

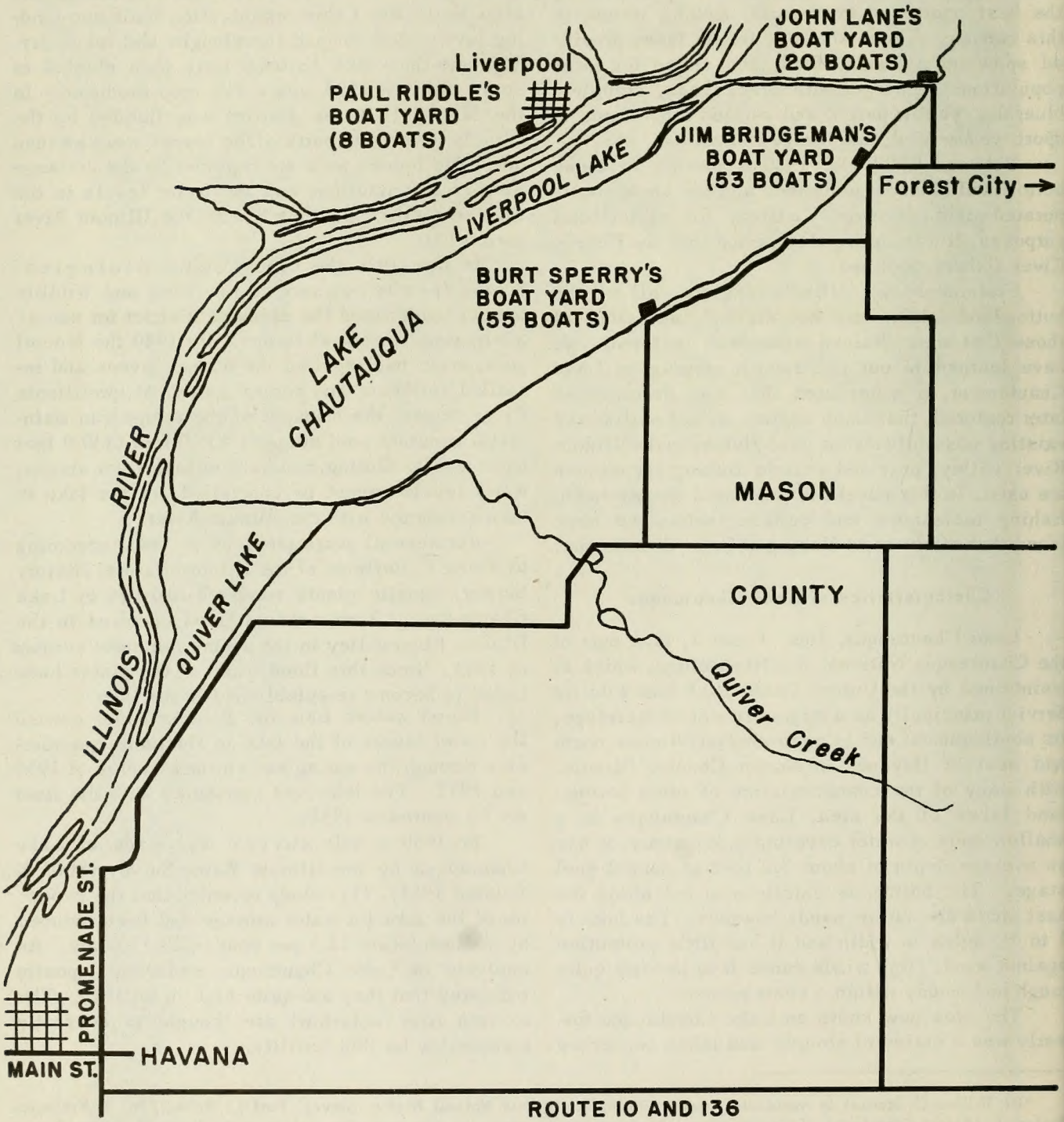


Fig. 2. -- Location of Lake Chautauqua and boat yards at the lake.

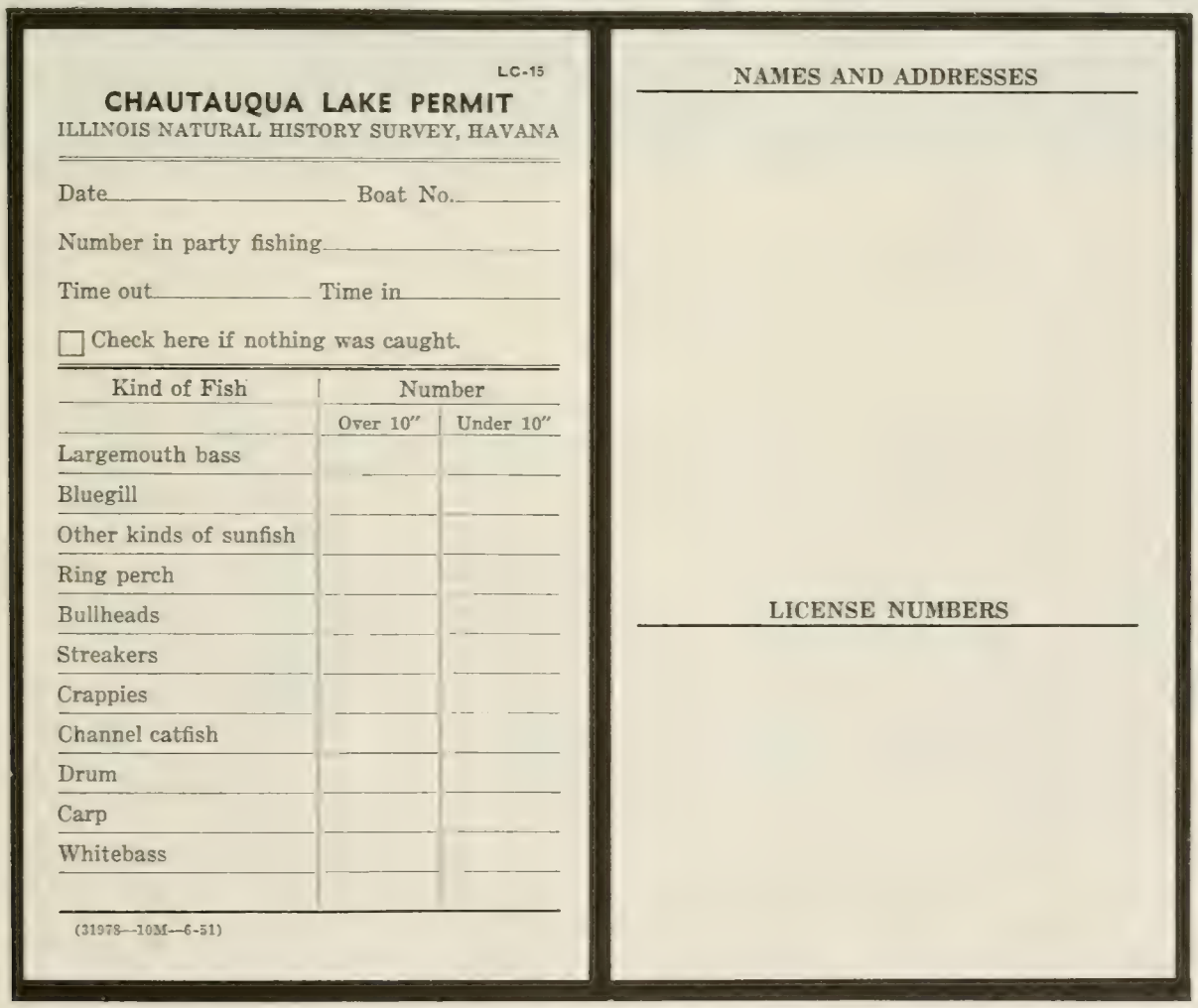
are as yet incomplete, and at present do not permit the drawing of final conclusions relative to the fishery, we believe that certain preliminary findings on the sport fishery will be of interest to anglers. Information now available relates to (1) kinds and numbers of fish caught by anglers; (2) annual changes in abundance of certain species of fishes; (3) annual changes in the average size of certain common fishes; (4) influence of water levels on fishing; (5) seasonal biting of certain species; and (6) types of fishing techniques that are successful in catching fishes.

Methods of Study

Creel censuses were made to determine the kinds and numbers of fishes caught by anglers, number of fishermen coming to the lake, number of hours they spent in fishing, and distance they traveled to fish. Since April 15, 1950, fishermen have been requested to obtain permits to fish at Lake Chautauqua. The fishing permits, which are issued free of charge to anglers at the four boat yards on or near the lake, fig. 2, function as creel-census cards, fig. 3.

Since shore fishing is not permitted, most anglers must go through one of these boat yards if they are to fish on the lake. During the summer months a few permit cards are issued to nearby cottage owners and permanent local residents. Such anglers complete their own creel cards and deposit them in conveniently located collection boxes. In the winter of 1950-51 some ice fishermen fished without permits; however, it is believed that catch records were obtained from the majority.

When a fisherman goes out from a boat yard, the boat liveryman fills in, on the permit card, the fisherman's name, address, license number, and



LC-15

CHAUTAUQUA LAKE PERMIT

ILLINOIS NATURAL HISTORY SURVEY, HAVANA

Date_____ Boat No._____

Number in party fishing_____

Time out_____ Time in_____

☐ Check here if nothing was caught.

Kind of Fish	Number	
	Over 10"	Under 10"
Largemouth bass		
Bluegill		
Other kinds of sunfish		
Ring perch		
Bullheads		
Streakers		
Crappies		
Channel catfish		
Drum		
Carp		
Whitebass		

(31978—10M—6-51)

NAMES AND ADDRESSES

LICENSE NUMBERS

Fig. 3. -- Combination permit and creel-census card used at Lake Chautauqua, 1950 and 1951.

Fig. 4. -- A white crappie scale (greatly enlarged). The number of rings or annuli on the scale denote the age of the fish. Five annuli (denoting approximately 5 years of growth) are shown. Vertebrae and spines are used in aging catfish and bullheads.

time of departure, and retains his state fishing license. When the fisherman returns to the boat yard, the liveryman checks the catch, records it and the time on the permit card, and gives back the state fishing license to the fisherman.

Through the splendid co-operation of the boat-yard operators and the anglers, the permit system has enabled us to obtain fairly accurate statistics on the yield of the sport fishery of a large bottom-land lake of the Illinois River system.

On many week-ends, fish caught by anglers were weighed and measured by the authors. Scale samples were taken from many of the fish for later age determination, fig. 4.

In the late spring and summer months, minnow seine hauls were made along the lake shores to determine the annual spawning success of the various fish found in the lake. Also, young fish were collected with a small trap net. In 1951, rotenone was used to poison the fishes in one small bay of the lake, in order to test the efficiency of fishing gear in taking small fishes and to sample any species that were missed in minnow seining.

In each of the two falls, 1-inch-mesh wing nets with leads were set at designated stations. These nets, which caught samples of the larger fishes, were particularly useful in determining size distribution of crappies and other species.

Crappies (7 inches or larger) caught in these netting operations were released after being marked, each by a numbered tag fastened to one of the gill covers. This method of marking fish is shown in fig. 5. Recaptures of marked crappies allowed us to estimate the population, to calculate the rate of exploitation of these fish by fishermen, and to acquire some information on fish movement.

Records were made of the sport fishes taken by commercial fishermen in seine hauls and in wing nets fished in the lake. The catches often provided examples of unusually large sport fish not ordinarily appearing in anglers' catches or in our small-mesh net sets.

Fig. 5. -- White crappie being tagged. Each fall at Lake Chautauqua, crappies are caught, tagged, and returned to the lake. The size of the population is estimated on the basis of the number of tagged fish that are recaptured.

Kinds and Numbers of Fishes

In 1950 and 1951, anglers at Lake Chautauqua caught and kept 25 different kinds of fishes, tables 1 and 2. The most popular fishes were channel catfish, bluegills, crappies, yellow bass, freshwater drum, and largemouth bass.

In 1950, a total of 36,822 fish, table 2, were caught in 10,459 fisherman-days. Most of these fish were caught during the spring, summer, and fall months. A few fish (812) were caught through the ice in late December of 1950.

In January and February of 1951, ice fishermen caught 14,546 fish in 1,026 fisherman-days. Crappies comprised 98.3 per cent of this catch. For the entire 1951 season, the catch was 56,289 fish, table 2, taken in 13,630 fisherman-days, including the period of ice fishing.

The average annual yield of sport fish at Lake Chautauqua for 1950 and 1951 was 5.6 pounds per acre. The average annual fishing pressure was 18.2 man-hours per acre.

More than 80 per cent of the anglers in 1950 and 1951 drove to the lake from distances of 25 miles or more. The majority of these anglers came from the Peoria-Pekin area, a distance of 40 to 50 miles. A number of anglers drove 50 to 100 miles to the lake from Springfield, Jacksonville, Bloomington, and Champaign, Illinois. A few anglers came from the Chicago area.

Some Factors That Affect Fishing

In 1950 and 1951, the species composition of the anglers' catches, and the number of fish caught per fisherman-day, varied with water levels, season, and the relative abundance of catchable-size fish. These various factors, as they relate to individual species of fish, are included in the discussions of these species.

Water Levels

During periods of low, stable water levels, fishing in the late spring and summer months of 1950 and 1951 was consistently poor as compared with that recorded for periods of rising and high

Table 1. -- Accepted common, scientific, and local names of fishes taken by anglers in 1950 and 1951 at Lake Chautauqua.

Accepted Common Name	Scientific Name	Local Name
Gars		
Longnose gar	Lepisosteus osseus (Linnaeus)	Billy gar, pickerel, gar
Shortnose gar	Lepisosteus platostomus Rafinesque	Gar, pickerel, billy gar
Bowfin		
Bowfin	Amia calva Linnaeus	Dogfish, grindle
Mooneye		
Mooneye	Hiodon tergisus Le Sueur	Herring
Herring		
Gizzard shad	Dorosoma cepedianum (Le Sueur)	Shad
Eel		
American eel	Anguilla bostoniensis (Le Sueur)	Eel
Sucker		
Quillback	Carpiodes cyprinus (Le Sueur)	Silver carp
Introduced carp		
Carp	Cyprinus carpio Linnaeus	German carp
Fresh-water catfishes		
Channel catfish	Ictalurus lacustris (Walbaum)	Morgan cat, fiddler, catfish, bluecat
Yellow bullhead	Ameiurus natalis (Le Sueur)	Yellow cat, yellow-bellied cat
Brown bullhead	Ameiurus nebulosus (Le Sueur)	Bullhead, willow cat, speckled bullhead
Black bullhead	Ameiurus melas (Rafinesque)	Bullhead
Flathead catfish	Pilodictis olivaris (Rafinesque)	Yellow cat, mudcat
Perch		
Yellow perch	Perca flavescens (Mitchill)	Perch, ring perch, ringtail perch
Black basses and sunfishes		
Smallmouth black bass	Micropterus dolomieu Lacépède	Smallmouth
Largemouth black bass	Micropterus salmoides (Lacépède)	Bigmouth, black bass, bass
Green sunfish	Lepomis cyanellus Rafinesque	Goggle-eye, sunfish
Bluegill	Lepomis macrochirus Rafinesque	Sunfish
Pumpkinseed	Lepomis gibbosus (Linnaeus)	Sunfish
Warmouth	Chaenobryttus coronarius (Bartram)	Rock bass, goggle-eye
White crappie	Pomoxis annularis Rafinesque	Crappie, white crappie
Black crappie	Pomoxis nigro-maculatus (Le Sueur)	Calico bass, black crappie, crappie
Basses		
White bass	Lepibema chrysops (Rafinesque)	Striped bass
Yellow bass	Morone interrupta Gill	Streaker
Drum		
Freshwater drum	Aplodinotus grunniens Rafinesque	Drum, sheepshead, white perch

Table 2. -- Species composition of anglers' catch at Lake Chautauqua in 1941, 1942, 1950, and 1951.

Kind of Fish	1941[1]		1942[1]		1950[2]		1951[2]	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Crappie	681	14.4	357	5.0	10,096	27.4	35,462	63.0
Bluegill	2,043	43.3	3,622	50.5	7,626	20.7	9,335	16.6
Freshwater drum	55	1.2	4	0.1	9,459	25.7	4,274	7.6
Yellow bass	9	0.2	1,236	17.2	5,222	14.2	2,590	4.6
Channel catfish	13	0.3	0	0.0	1,205	3.3	1,206	2.1
Largemouth bass	426	9.0	450	6.3	1,348	3.7	1,104	2.0
White bass	0	0.0	0	0.0	20	0.0	805	1.4
Bullheads	56	1.2	75	1.0	771	2.1	483	0.9
Yellow perch	1,002	21.2	1,110	15.5	501	1.4	443	0.8
Sunfishes[3]	400	8.5	306	4.3	281	0.7	345	0.6
Other species	34	0.7	4	0.1	293	0.8	242	0.4
Total number of fish	4,719	100.0	7,164	100.0	36,822	100.0	56,289	100.0
Fish per fisherman-day	2.8	- - -	4.6	- - -	3.5	- - -	4.1	- - -
Fish per hour	0.7	- - -	1.0	- - -	0.7	- - -	0.7	- - -

[1] Based on Hansen's (1942) study, which included catch from only one boat yard.
[2] Based on complete creel census of the lake.
[3] Sunfishes other than bluegill. Includes warmouth, green sunfish, and pumpkinseed.

water stages, fig. 6. In general, fishing declined during both years when the water level of the lake was falling. However, fishing for at least one species was at its best when the water level was either falling or was at a low, stable stage.

Season

The 2-year catch data from Lake Chautauqua indicate that the species composition of the anglers' catches and number of fish caught per fisherman-day varied from season to season. These catch data are presented by seasons in table 3 and are illustrated graphically in fig. 7.

Population Abundance

A species of fish that is caught readily during a given year at Lake Chautauqua may practically disappear from the creel within the next 3 years. This change in the catch often may be due to a radical change in the abundance of a single dominant year-class or brood of a single species.

Dr. David H. Thompson (1941) noted the fairly regular occurrence of a dominant brood of crappies in Lake Senachwine, an Illinois River bottomland lake near Henry, and the marked influence of this brood upon the other fish in the lake. He stated: "A few large crappies produce a large brood of young which survive. In subsequent years this dominant brood devours its own young as well as the young of other fish. This yearly elimination of spawn and young continues until the original dominant brood is so reduced in numbers (almost entirely by natural causes) that the survivors can no longer gather up all the young spawned; then the cycle repeats. In this way the crappie not only produces a cycle in its own kind but imposes it on many other non-cannibalistic fish. This has a striking effect on both hook-and-line and commercial fishing. During part of the cycle in Lake Senachwine as many as 99 per cent of the black crappies were of catchable size. This was followed by a period when there were as few as one or two per cent of large fish."

Fishing Techniques and Factors

Two years of creel censusing at Lake Chautauqua showed that many factors influence

the catch of fish. Some of these factors are associated with seasons and physical conditions in the lake. Others are associated with changes in the fish population and with the amount of fishing "know-how" of the anglers using the water. Most anglers who were unsuccessful either did not know how to fish or persisted in fishing for the kinds of fish that were either not biting or were scarce.

In order to help Lake Chautauqua anglers catch more fish we held a fishing "college" for them at the lake in June, 1951. At this "college," experienced local anglers demonstrated methods they use to catch fish at Chautauqua.

In the following section, we have listed the kinds of fishes of greatest interest to anglers at Lake Chautauqua, with something of their relative importance to the fish population in 1950 and

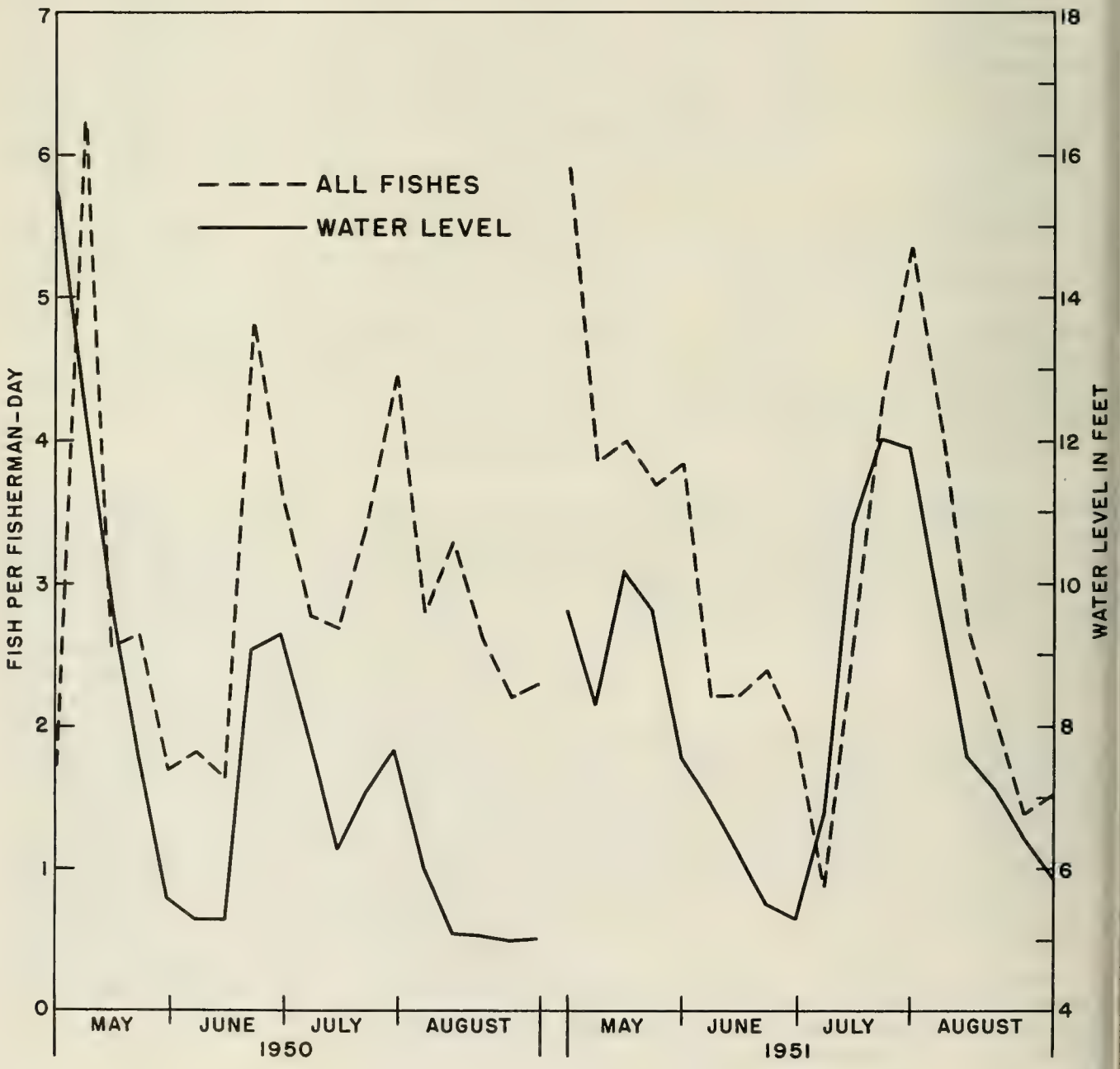


Fig. 6. -- Weekly averages of water levels and corresponding catches of all fishes per fisherman-day at Lake Chautauqua in the late spring and summer months of 1950 and 1951. It is apparent from the graph that fishing improved with rising water levels.

1951, of their behavior in relation to certain changes in the physical environment, and of methods used successfully in catching them. These kinds include the white crappie, black crappie, bluegill, perch, channel catfish, drum, carp, yellow bass, white bass, and largemouth bass.

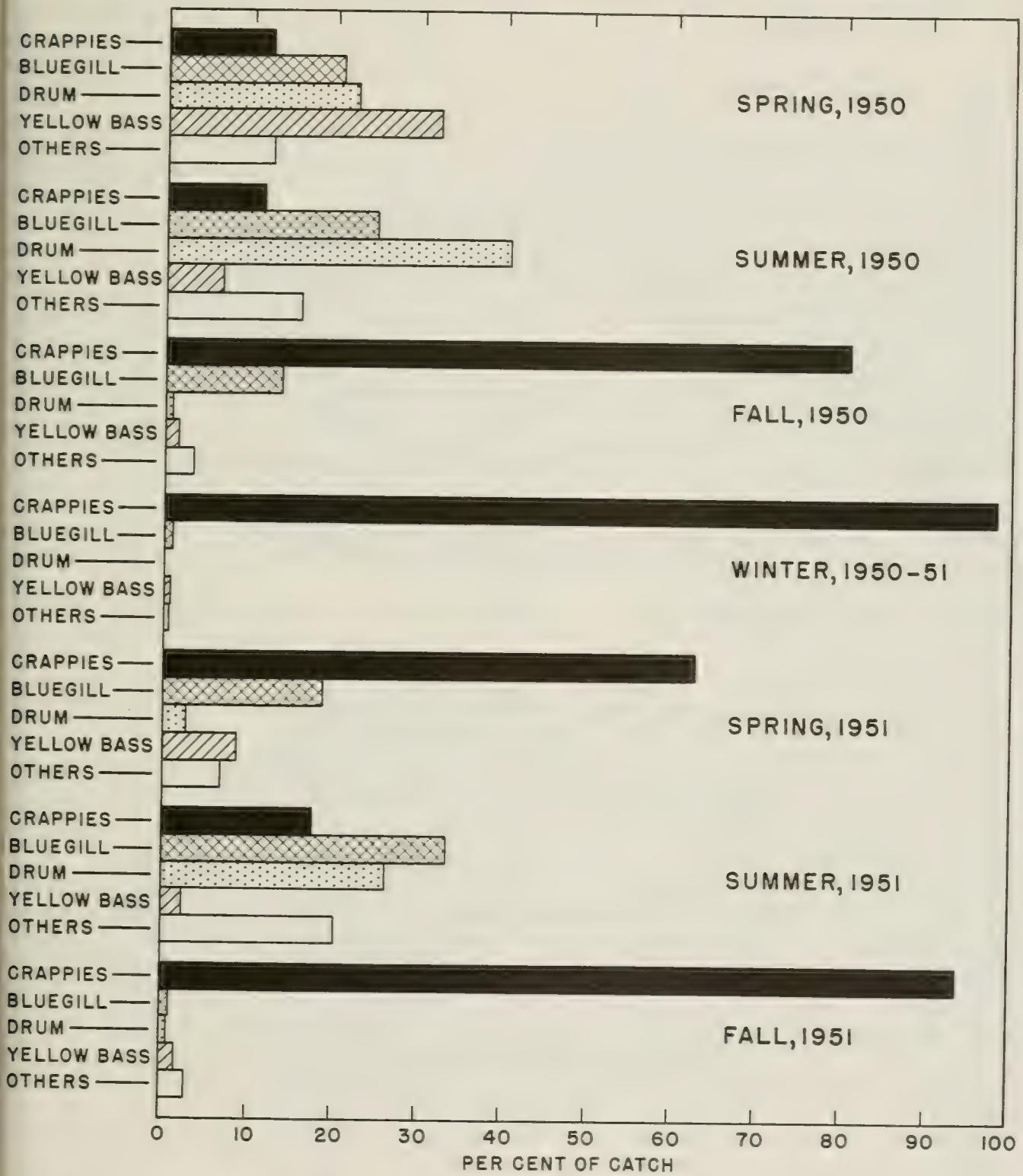


Fig. 7. -- Seasonal composition of the anglers' catches at Lake Chautauqua in 1950 and 1951. It will be noted that the anglers' catches varied with the seasons.

Table 3. -- Species composition of anglers' catch, number of fish caught per fisherman-day, and average number of hours comprising a fisherman-day at Lake Chautauqua, 1950 and 1951.

Kind of Fish	Spring, 1950 (4.52)[1]			Summer, 1950 (5.55)[1]			Fall, 1950 (5.59)[1]			Winter, 1950-51 Ice Fishing (4.13)[1]		
	Number of Fish	Fish Per Fisher-man Day	Per Cent of Catch	Number of Fish	Fish per Fisher-man Day	Per Cent of Catch	Number of Fish	Fish per Fisher-man Day	Per Cent of Catch	Number of Fish	Fish per Fisher-man Day	Per Cent of Catch
White crappie[2]	1,372	0.31	11.2	785	0.16	4.8	4,369	4.54	59.9	13,596	12.75	88.5
Black crappie[2]	142	0.03	1.1	1,142	0.23	6.9	1,516	1.58	20.8	1,511	1.42	9.8
Bluegill	2,538	0.56	20.7	4,073	0.81	24.8	1,007	1.05	13.8	124	0.12	0.8
Freshwater drum	2,738	0.61	22.3	6,668	1.33	40.6	53	0.05	0.7	1	0.00	0.0
Yellow bass	3,938	0.88	32.1	1,144	0.23	6.9	113	0.12	1.5	76	0.07	0.5
Channel catfish	278	0.06	2.3	910	0.18	5.5	17	0.02	0.2	0	0.00	0.0
Other fishes	708	0.16	5.8	1,033	0.21	6.3	102	0.11	1.4	11	0.01	0.1
Largemouth black bass	550	0.12	4.5	688	0.14	4.2	106	0.11	1.5	39	0.04	0.3
White bass	6	0.00	0.0	0	0.00	0.0	14	0.01	0.2	0	0.00	0.0
Total or Average	12,270	2.73	100.0	16,443	3.29	100.0	7,297	7.59	100.0	15,358	14.41	100.0

Kind of Fish	Spring, 1951 (5.86)[1]			Summer, 1951 (5.65)[1]			Fall, 1951 (5.29)[1]		
	Number of Fish	Fish per Fisher-man-Day	Per Cent of Catch	Number of Fish	Fish per Fisher-man-Day	Per Cent of Catch	Number of Fish	Fish per Fisher-man-Day	Per Cent of Catch
White crappie[2]	13,466	2.08	55.2	913	0.17	6.7	3,075	3.99	84.0
Black crappie[2]	1,797	0.28	7.4	1,510	0.28	11.0	364	0.47	9.9
Bluegill	4,603	0.71	18.9	4,583	0.86	33.5	33	0.04	0.9
Freshwater drum	649	0.10	2.7	3,594	0.67	26.3	30	0.04	0.8
Yellow bass	2,175	0.33	8.9	312	0.06	2.3	54	0.07	1.5
Channel catfish	436	0.07	1.8	754	0.14	5.5	16	0.02	0.4
Other fishes	573	0.09	2.3	886	0.17	6.4	47	0.06	1.3
Largemouth black bass	530	0.08	2.2	502	0.09	3.7	36	0.05	1.0
White bass	155	0.02	0.6	641	0.12	4.6	9	0.01	0.2
Total or average	24,384	3.76	100.0	13,695	2.56	100.0	3,664	4.75	100.0

[1] Average number of hours per fisherman-day.
[2] Species of crappies separated on basis of biologist's creel-analysis census.

White Crappie

The white crappie, fig. 8, dominated the anglers' catches of crappies at Lake Chautauqua in 1950 and 1951. This species is easily caught by anglers when it is present in large numbers, as was the case during the 2 years of the study. White crappies tended to congregate in fall and winter months in man-made brush piles that had been constructed 50 to 100 yards off shore. At one brush pile in 1951, anglers caught over 20,000 white crappies. This brush pile was about 10 feet wide and 100 feet long.

No special refinement of technique is required

Fig. 8. -- White crappie, above, and black crappie, below, both of which occur in Lake Chautauqua. The two species may be separated on the basis of several characters. The white crappie usually has six dorsal spines, whereas the black has seven or eight. The base of the dorsal fin, BC, of the white crappie is much shorter than the distance AB. In the black crappie, the length BC is approximately equal to AB.

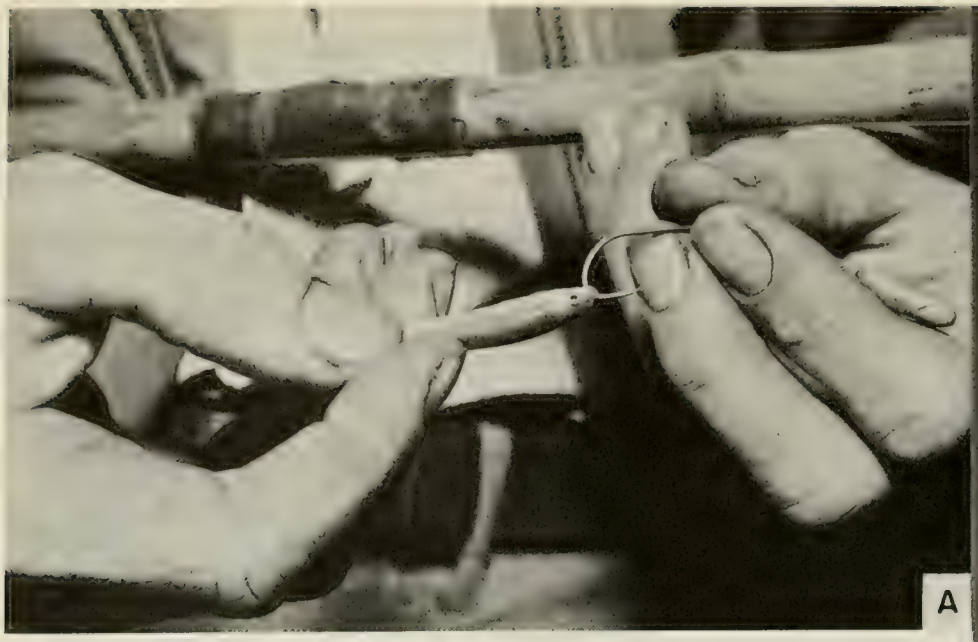
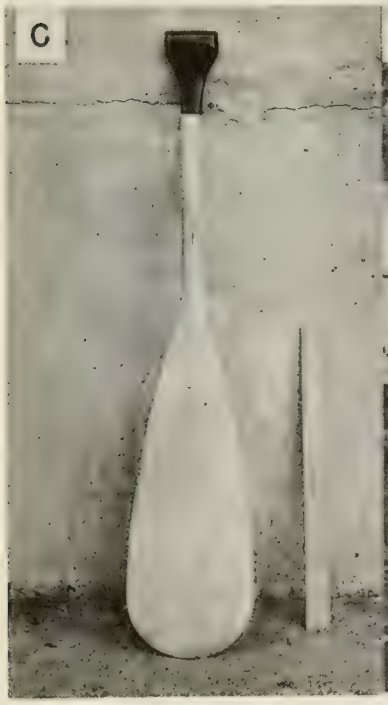


Fig. 9. -- Tackle and techniques for catching crappies in buckbrush or buttonbush, as used by J. F. Gregory of Glasford. Cane pole is 7½ feet long. Guides are mounted on pole with electrician's tape. Nylon-leader line is secured near base of pole and strung through guides. A, a live minnow is hooked through lower and upper lips. B, above baited hook are a bobber and a heavy sinker. C, D, a small paddle is used in propelling boat quietly toward buckbrush. Minnow is dropped into brush. Pole is constantly fished with free hand. If hook is snagged, pulling on line forces tip of pole and bobber toward hook; with aid of heavy sinker, hook is soon jiggled free. Photo of Gregory in boat from the Illinois Department of Conservation.



to catch either white crappies or black crappies in or near a brush pile, provided the population is high. In the fall months the angler merely ties or anchors his boat at the edge of the brush pile and drops his minnow into the brush. In the winter the fisherman cuts a small hole in the ice over the brush pile and drops his minnow through the hole down into the brush.

Some of the more successful crappie fishermen use a 7½-foot cane pole with guides (brush pole), a nylon-leader line, a lead sinker, a bobber, and a No. 2 to No. 6 hook baited with a live creek minnow about 2½ inches in length, fig. 9. The minnow is dropped in the water ahead of the sinker and bobber. The bobber should hit the water lightly.

Fishing along shore in the buckbrush or buttonbush (Cephalanthus occidentalis L.) can be done successfully in the spring, summer, and fall months. To fish the buckbrush properly requires a little practice. The boat should be moved slowly and quietly along the outside of the buckbrush. To accomplish this slow, quiet movement of the boat, either the angler should have a pusher operate the boat for him, or he should use a small, light paddle at one end of the boat, fig. 9.

Crappies may be caught in water as shallow as 6 inches. In water this shallow the bobber should be pulled down the line close enough to the hook to keep the minnow off the bottom. In water 2 feet in depth the minnow should be fished 6 inches or more from the bottom. If the water is 3½ to 4 feet deep, the minnow should be fished about 14 inches below the surface.

When a crappie takes the minnow, abrupt jerking of the pole should be avoided; otherwise the hook may be pulled out of the fish's weak mouth.

No correlation was noted between the success of crappie fishing and changes in water levels at Lake Chautauqua, fig. 10. Fishermen usually preferred low, stable water levels in fishing for crappies during the spring and fall seasons.

The relative abundance of crappies in the anglers' catch at Lake Chautauqua was not constant from year to year. In 1950, white crappies and black crappies together formed 27.4 per cent of the anglers' catch and, in 1951, 63.0 per cent, table 2; at one boat yard they had formed 14.4 per cent of the anglers' catch in 1941 and only 5.0 per cent in 1942 (Hansen 1942).

The difference between the 1950 and the 1951 catches of crappies was due principally to a change in the abundance of catchable-sized white crappies belonging to the dominant brood spawned in 1948.

At the beginning of the 1950 season, white crappies of this 1948 year-class were for the most part too small to interest anglers, fig. 11, and fish from older age groups were not abundant enough in the lake to make good fishing. As a result, white crappie fishing was poor in the spring of 1950, table 3.

The white crappies of the 1948 brood attained an average total length of 8.5 inches by September of 1950 and furnished anglers with excellent fishing that fall, fig. 12. Crappie fishing continued to be good through the winter of 1950-51 and the spring of 1951. The average total length of the white crappies caught during those periods remained at 8.5 inches. By the fall of 1951, members of the 1948 brood averaged 10.0 inches in length. Fishing continued to be good through the fall of 1951 because of the large number of the 1948 brood still present in the lake. Thus, white crappies spawned in 1948 provided the bulk of the crappie fishing in 1950 and 1951 and will dominate the catch through 1952. By the fall of 1952 these white crappies will probably average 11.0 inches or more in length.

The abundance of this 1948 year-class of white crappies is decreasing each year. Tagging studies indicate that hundreds of thousands of these fish vanished from the lake between October, 1950, and October, 1951. In all probability some of them emigrated from the lake; however, to date we have not received a tag return of a white crappie caught outside of the lake. We believe that the bulk of these fish died in the lake from natural causes and were therefore lost to fishermen.

Field observations and scale studies indicate that the white crappies of Lake Chautauqua are relatively short lived. Of the many thousands of white crappies we handled in the field in 1950 and 1951, the largest was slightly more than 14 inches in length. Its age was determined as 7 years. Few other white crappies even approached this fish in size, and those we aged by the scale method were 6 years of age or younger.

Spawning of white crappies apparently was very unsuccessful in 1949 and 1951. It was comparatively successful in 1950, and the brood produced should provide some fishing in future years, but not so much as that provided by the 1948 brood.

White crappie fishing will probably decline by the fall of 1952 or by 1953 because of the progressive reduction of the 1948 brood through

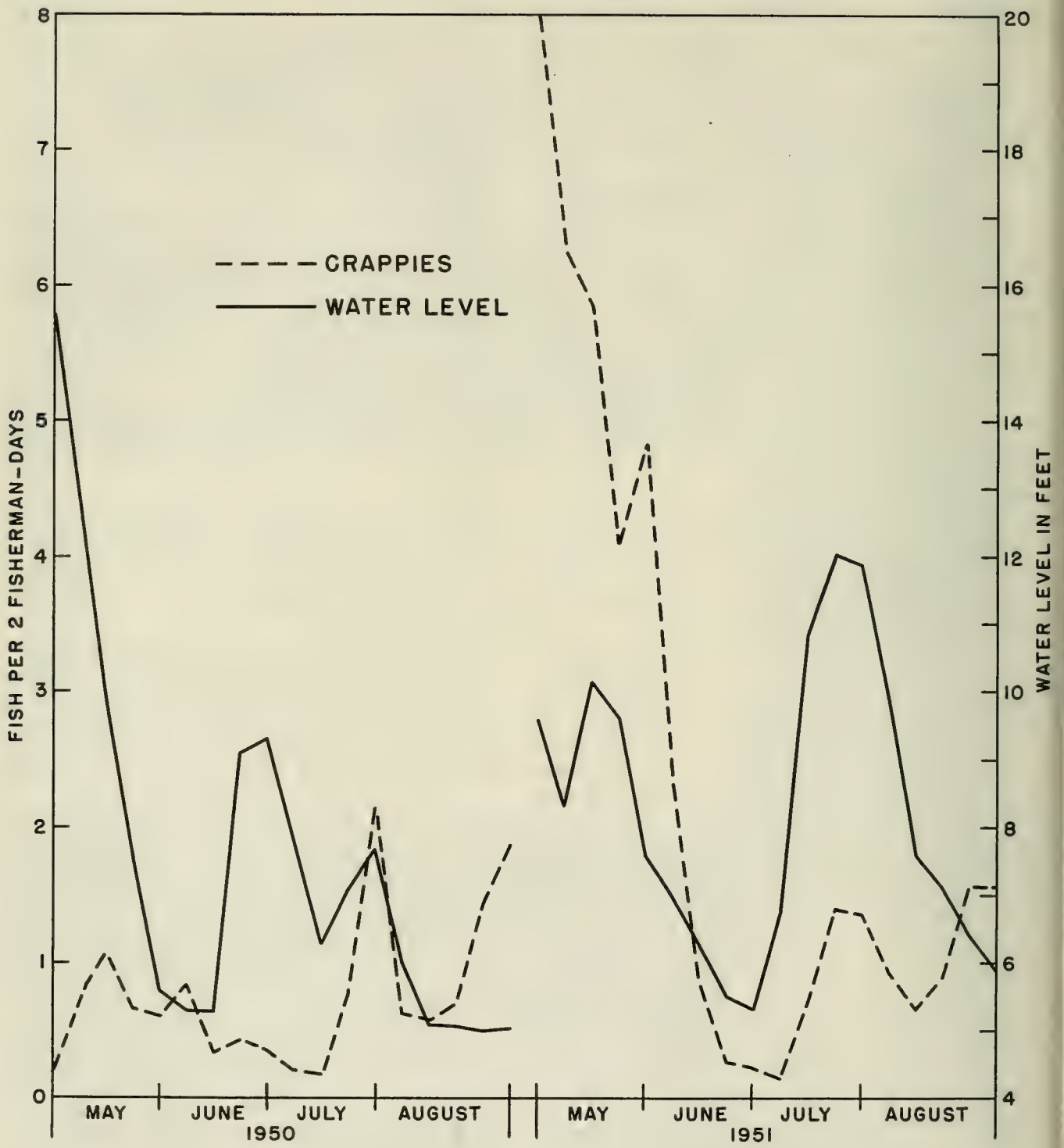


Fig. 10. -- Weekly average water levels and corresponding average catches of crappies per 2 fisherman-days at Lake Chautauqua in the late spring and summer months of 1950 and 1951. There appears to be no correlation between water levels and the rate of catch of crappies.

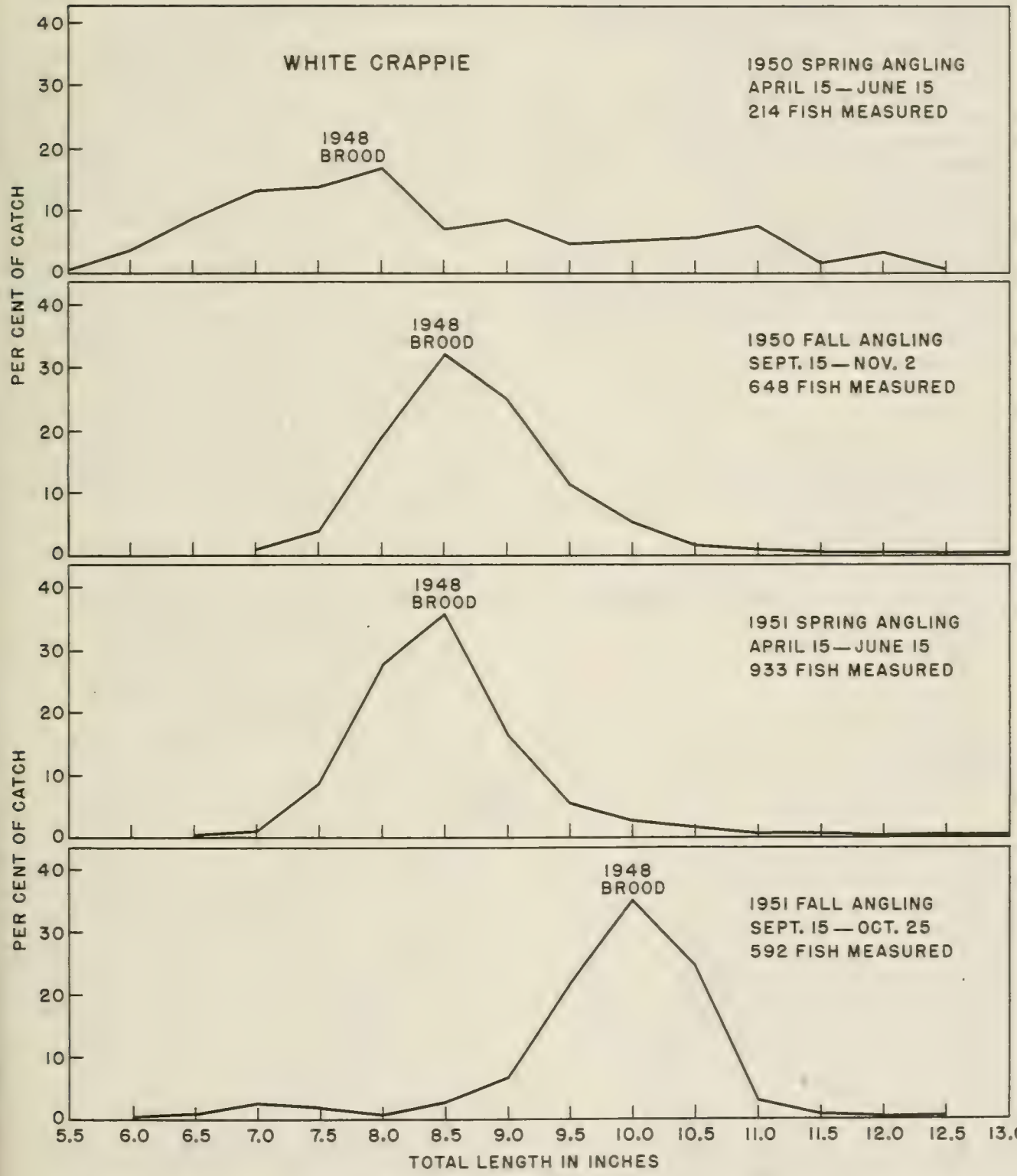


Fig. 11. -- The size distribution of white crappies in anglers' catches at Lake Chautauqua during the various seasons of 1950 and 1951. The graph indicates that white crappies spawned in 1948 dominated the fall catch of 1950 and the spring and fall catches of 1951.

natural mortality and the lack of younger broods of replacement size. Also, increased difficulties experienced by anglers in catching large crappies will probably affect the catch either in the fall of 1952 or in 1953.

If the white crappies at Lake Chautauqua follow the pattern or cycle described above by Dr. Thompson for the black crappie, a large spawn of white crappies will not be produced in the lake until the 1948 brood is greatly reduced in number, possibly by 1953. If this prediction proves to be true, white crappie fishing should be good in the fall of 1955. (However, it is possible that some other species, such as the black crappie or the white bass, may become abundant enough to prevent the white crappie from successfully producing a large and dominant brood.)

Black Crappie

The black crappie, fig. 8, comprised only a small percentage of the anglers' catches of crappies in 1950 and 1951 at Lake Chautauqua. Wing-net catches made during those 2 years indicated that white crappies were much more abundant in the lake than were black.

In the fall of 1950 the black crappie was represented in the catch largely by members of the 1948 brood, fig. 13; however, the size of this brood was quite small as compared with the size of the 1948 brood of white crappies. Spawning in 1949 was rather unsuccessful for black crappies. In 1950, these crappies were moderately successful in spawning, and, in 1951, they produced some young, as indicated by minnow seine sampling.

Very few black crappies were caught by anglers fishing in the man-made brush piles. Black crappies were caught in numbers in 1950 and 1951 by anglers who fished the buckbrush along shore. The method and tackle used was described in the section on white crappies. We suggest that anglers concentrate on fishing in the buckbrush for black crappies during years of low white crappie populations. The 1950 brood of black crappies may be large enough to provide some good crappie fishing during 1952 and 1953.

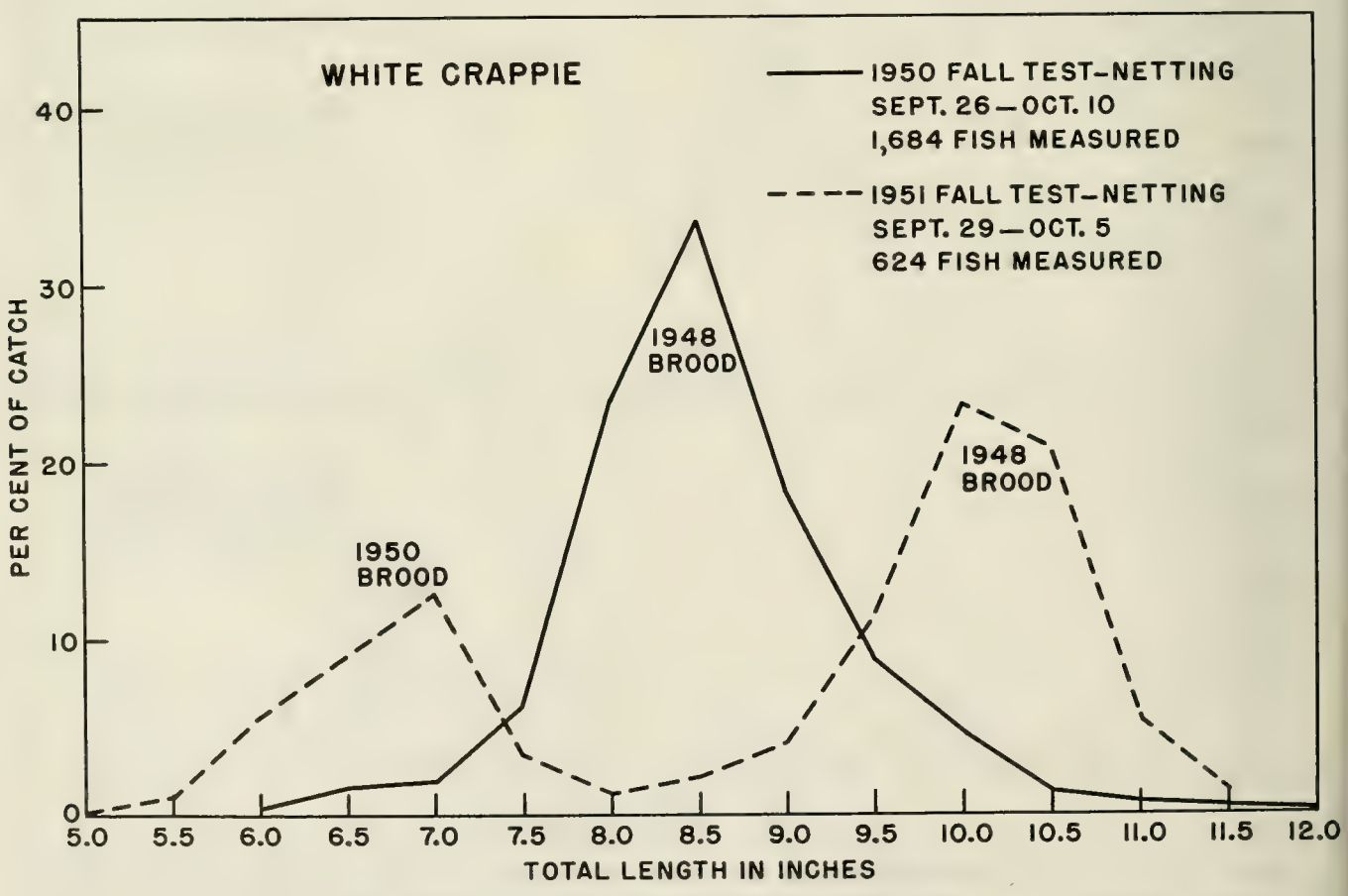


Fig. 12. -- The size distribution of white crappies caught in 1-inch-mesh wing nets at Lake Chautauqua in the falls of 1950 and 1951. In both years the 1948 brood dominated the catch.

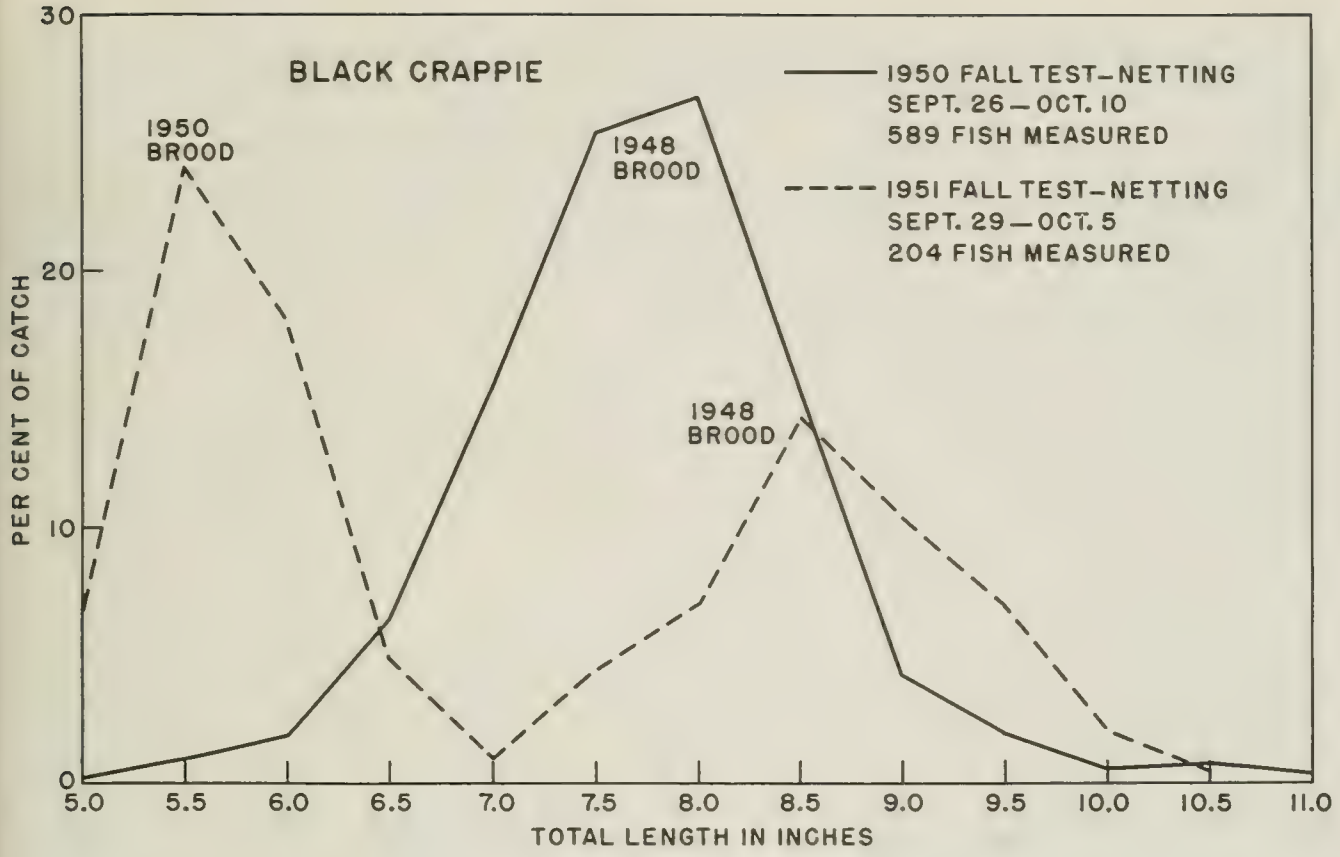


Fig. 13. -- The size distribution of black crappies caught in 1-inch-mesh wing nets at Lake Chautauqua in the falls of 1950 and 1951.

Bluegill

In 1950 and 1951, bluegill fishing at Lake Chautauqua was best during the late spring and summer months, table 3 and fig. 7.

It may be noted in fig. 14 that the rate of catch of the bluegill varied from week to week during the spring and summer of 1950 and 1951. The weekly changes in fishing apparently were not directly related to water levels but to some other factor. Possibly this factor was the spawning activities of the bluegill. In 1951, bluegills spawned in Lake Chautauqua from late May through early August. The number of bluegills actively engaged in spawning and the number of males guarding nests will vary during the season. We believe there may be some correlation between spawning activity and the peaks of bluegill catches. Our creel-census data indicate that during the periods of the best bluegill fishing the anglers' catches were composed to a large extent of males that were in spawning condition.

A cane pole rig and a can of red worms are the usual tackle for catching bluegills. However, for successful bluegill fishing at Lake Chautauqua we recommend the addition of a small spinner to the usual tackle--plus a few simple techniques.

The pole used for bluegill fishing in buckbrush is about 7½ to 8 feet in length. The pole that provides the most sport for open water fishing is light in weight and does not exceed 10 feet in length. These two types of bluegill poles are rigged with either a nylon or a silk line, a No. 10 hook for buckbrush fishing or a No. 8 hook for open water fishing. A small double-blade spinner is attached to the eye of the hook. A lead sinker is secured above the spinner. Anglers usually prefer to use heavier sinkers on their lines when fishing in the buckbrush than in open water. The heavy sinkers enable them to free entangled hooks more readily. The bobber should be of the type that the angler can slip up or down the line so as to adjust it for different water depths. The bluegill rig described here is pictured in fig. 15. The hook is baited with three red worms in the manner shown.

The bobber is so adjusted that the worm-

spinner rig is fished about 4 inches off the bottom. The pole is constantly jiggled to keep the baited hook and spinner in a slow, up-and-down motion in the water.

Bluegills may be found anywhere from 5 feet to 100 yards off-shore. They seem to prefer hard mud bottom, whether it is in the buckbrush, near stumps, or in the open water. The successful anglers try various locations and keep hunting until they catch a bluegill. They then continue fishing the immediate area and are often rewarded for their effort, especially if the area proves to be a spawning bed.

In 1950, bluegills formed 20.7 per cent of the Lake Chautauqua anglers' catches and, in 1951, 16.6 per cent, table 2; in 1942, they had comprised 50.5 per cent of the catch at one boat yard (Hansen 1942).

Too few bluegills were caught in our fall netting programs to give accurate information regarding the size and age distribution of the bluegill population in 1950 and 1951. Fig. 16 suggests the presence of a single dominant year-class in the lake, but this was not verified by age analyses.

Sunfishes Other Than Bluegills

Three kinds of sunfishes other than bluegills

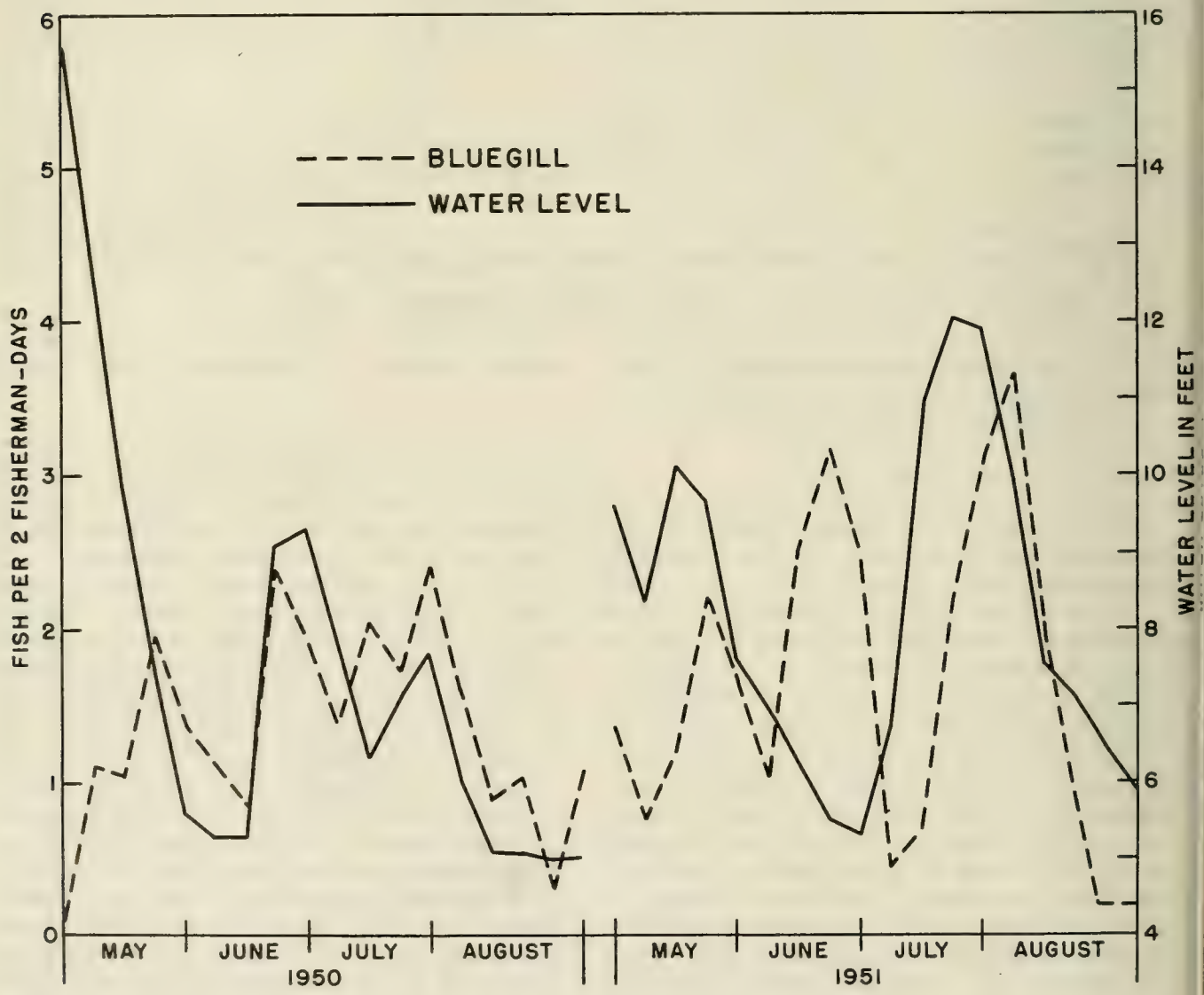


Fig. 14. -- Weekly average water levels and corresponding average catches of bluegills per 2 fisherman-days at Lake Chautauqua in the late spring and summer months of 1950 and 1951. There appears to be no correlation between water levels and rates of catch of bluegills. The peaks of bluegill fishing are probably associated with peaks of spawning activity.

Fig. 15. -- Bluegill fishing tackle and method of baiting a hook, as used by Robert Doren of Pekin. A, the bluegill tackle includes a silk or nylon line, No. 8 or No. 10 hook, small double-blade spinner, small swivel, lead sinker, and cork bobber. B, a red worm is hooked through the middle of the body so as to leave two ends free to wriggle in the water. C, two additional worms are placed on the hook in the manner shown in B. A cane pole is used with this tackle.

were caught occasionally by anglers at Lake Chautauqua in 1950 and 1951. These were the warmouth, the pumpkinseed, and the green sunfish. None of these was abundant enough to be of much importance to the sport fishery.

Warmouths are often called rock bass by Lake Chautauqua anglers; to date we have not found any rock bass in the lake. More warmouths were caught in the spring and fall than in any other seasons. During the spring and fall warmouths were caught in the buckbrush by anglers who were fishing with minnows for crappies.

A few pumpkinseeds and green sunfish were caught on worms in late spring and summer.

Yellow Perch

Many anglers have stated that 10 years ago they caught large numbers of yellow perch (ring perch) at Lake Chautauqua and that now they seldom catch a fish of this kind. Hansen's (1942) study of sport fishing at Lake Chautauqua verifies the anglers' reports of good perch fishing in 1941 and 1942, table 2. In those years, yellow perch averaged 17.8 per cent of the anglers' catches at one of the Lake Chautauqua boat yards, whereas in 1950 and 1951 this species averaged only 1.0 per cent of the catch.

James Bridgeman, a boat-yard operator at Lake Chautauqua, told us that the last good catches of yellow perch he remembers were taken from the lake by ice fishermen during the winter of 1944-45.

According to Greene (1935), aquatic vegetation is usually necessary for the successful spawning of yellow perch. The decline of the yellow perch in the lake after the winter of 1944-45 roughly coincides with the virtual disappearance of aquatic vegetation in 1943. While the decline in the perch

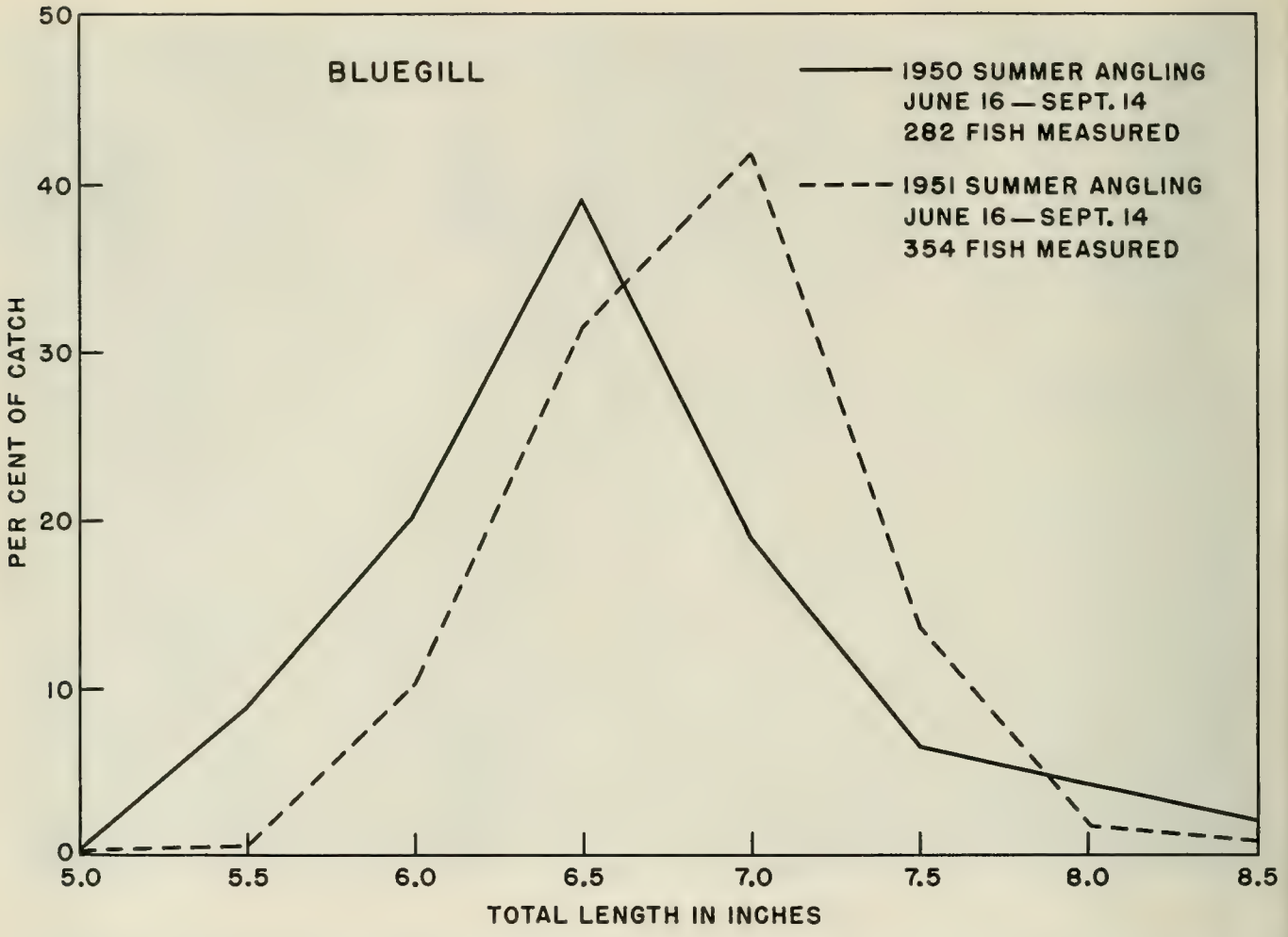


Fig. 16. -- Size distribution of bluegills caught by anglers at Lake Chautauqua in the summer months of 1950 and 1951.

fishery could have been due to several causes, we have tentatively concluded that the decrease in vegetation was probably the principal one.

Yellow perch were caught occasionally in 1950 and 1951 by anglers fishing for bluegills and yellow bass. The perch was too scarce to be of much importance to the sport fishery of Lake Chautauqua.

Channel Catfish

The channel catfish is highly regarded by Lake Chautauqua anglers, though very few of these anglers actually fish entirely for catfish. Most catfish are caught by anglers fishing for bluegills, black bass, or freshwater drum.

Live minnows, dead minnows, and worms are the baits usually used for catfish at Lake Chautauqua. Catfish are caught in hollow stumps, in the buckbrush, and in water flowing through cuts in the levee during periods of high water.

Creel-census data indicate a positive correlation between rising or high water levels and an increase in the catch of catfish, fig. 17.

In 1950 and 1951, channel catfish comprised 2.6 per cent of the catch at Lake Chautauqua, table 2. In 1941 and 1942, very few of these catfish were caught at the Lake Chautauqua boat yard studied by Hansen (1942). In those 2 years catfish averaged only 0.1 per cent of the anglers' catches.

Freshwater Drum

The freshwater drum comprised 40.6 per cent of the anglers' catch at Lake Chautauqua in the summer of 1950 and only 26.3 per cent in the summer of 1951, table 3.

The best fishing conditions for drum in 1950 and 1951 were during periods when the water level was rising or at a high stage, fig. 18. During such periods, anglers had their greatest success in fish-

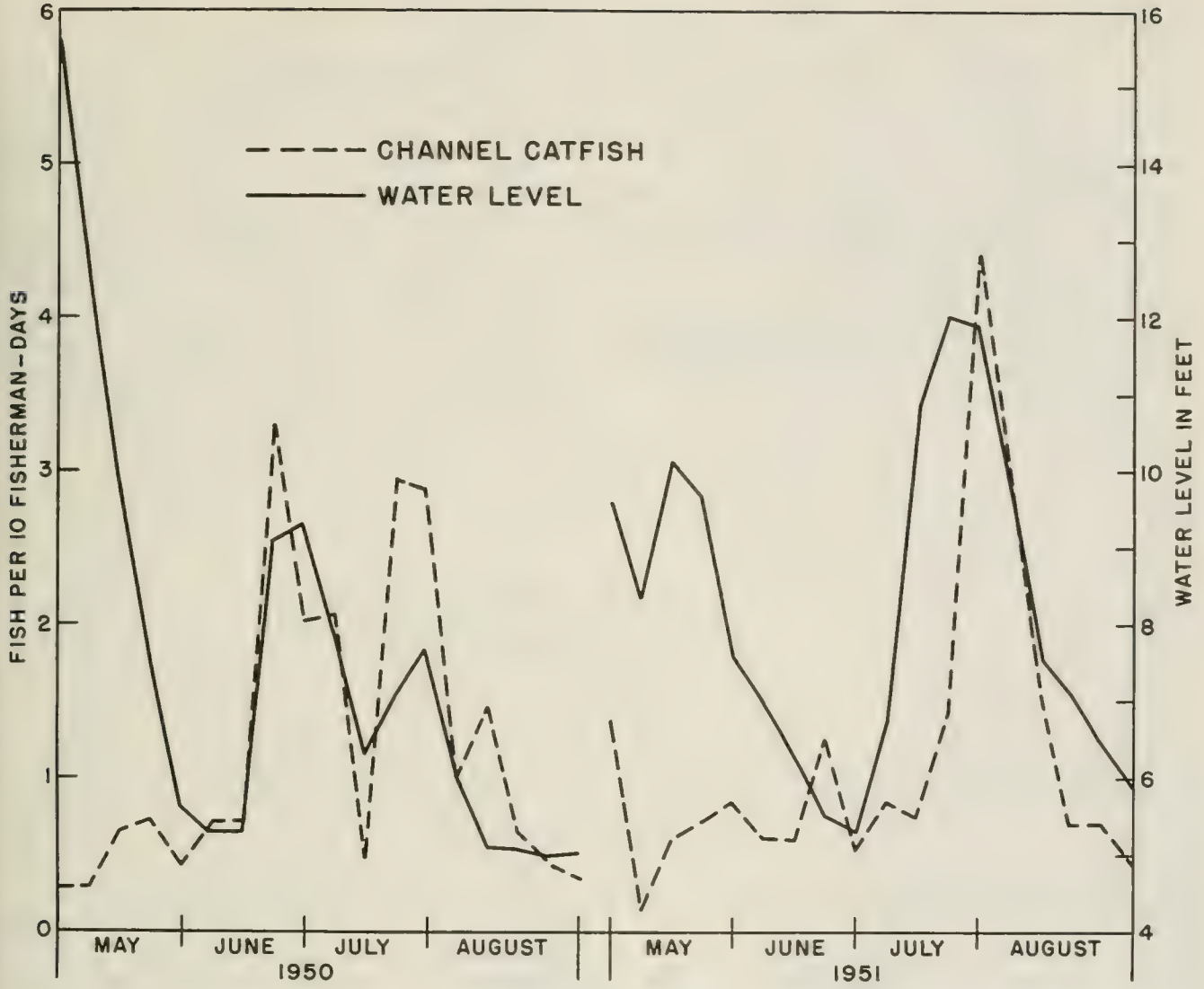


Fig. 17. -- Weekly average water levels and corresponding average catches of channel catfish per 10 fisherman-days at Lake Chautauqua in the late spring and summer months of 1950 and 1951. The graph indicates that fishing for catfish was best when the water level either was rising or was high.

ing with worms at places near the levee where the river water was flowing into the lake.

Available figures, table 2, indicate that the anglers' catch of freshwater drum at Lake Chautauqua has increased considerably since 1941. At the boat yard censused by Hansen (1942), drum amounted to only 1.2 per cent of the catch in 1941 and only 0.1 per cent in 1942; in 1950 and 1951 drum averaged 14.7 per cent of the anglers' catch at the lake.

Carp

Carp are abundant in Lake Chautauqua; however, only 246 were caught by anglers in 1950 and 141 in 1951. These carp were usually caught by anglers fishing for other species of fishes.

The majority of the carp in anglers' catches weighed less than 3 pounds each. Carp in the commercial catches from the lake averaged 6 pounds, and some weighed over 20 pounds.

We have not observed a successful technique for catching Lake Chautauqua carp; however, on some waters a No. 1/0 or No. 2 hook baited with corn or a doughball is used successfully.

Yellow Bass

The yellow bass, or streaker, formed an important part of the anglers' catch at Lake

Chautauqua in the spring of 1950, fig. 7, amounting to 32.1 per cent of the catch. The best period of fishing for streakers was from the last week in April through the middle of May. In 1951, the last week in April was the only good week of yellow bass fishing.

In both years the best fishing for yellow bass occurred during periods of high water. Most of these fish were caught on worms near Burr Oak Island at the upper end of the lake.

A graph of the distribution of sizes of yellow bass caught by anglers suggests that this species does not spawn successfully each year, fig. 19. This species is pictured in fig. 20.

White Bass

The white bass, fig. 20, is one fish at Lake Chautauqua and nearby waters that may be caught very successfully on artificial lures. This fish is new to some central Illinois anglers and when taken by them is often confused with its relative the yellow bass, fig. 20.

The white bass has been abundant in Lake Chautauqua and neighboring waters since 1950. Evidently water conditions in the Havana section of the Illinois River were favorable for the spawning of white bass, as they appeared in the river and in Lake Chautauqua in 1950 and 1951 in larger numbers than had been seen there previously.

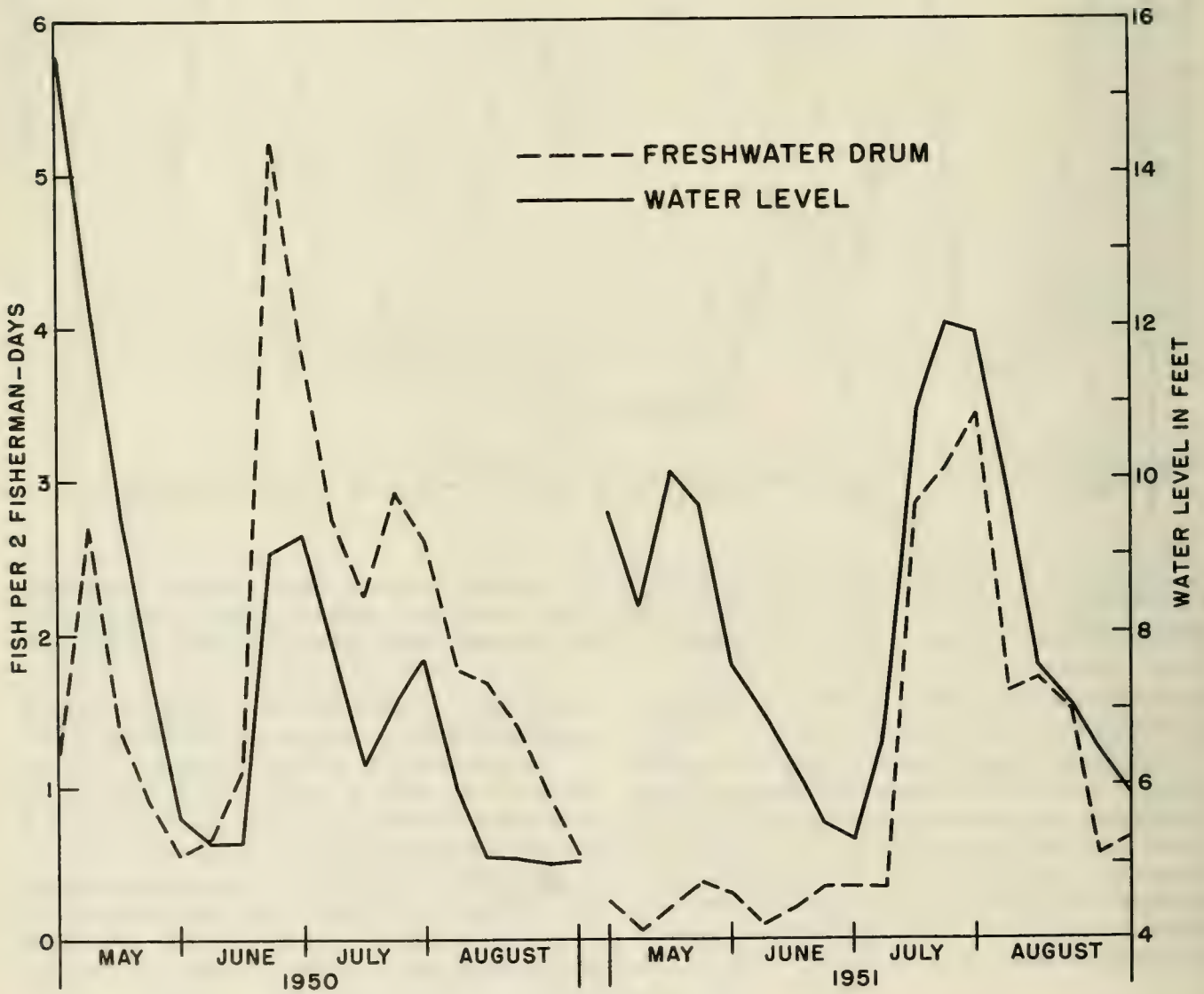


Fig. 18. -- Weekly average water levels and corresponding average catches of freshwater drum per 2 fisherman-days at Lake Chautauqua in the late spring and summer months of 1950 and 1951. Drum fishing was best when the water level either was rising or was high.

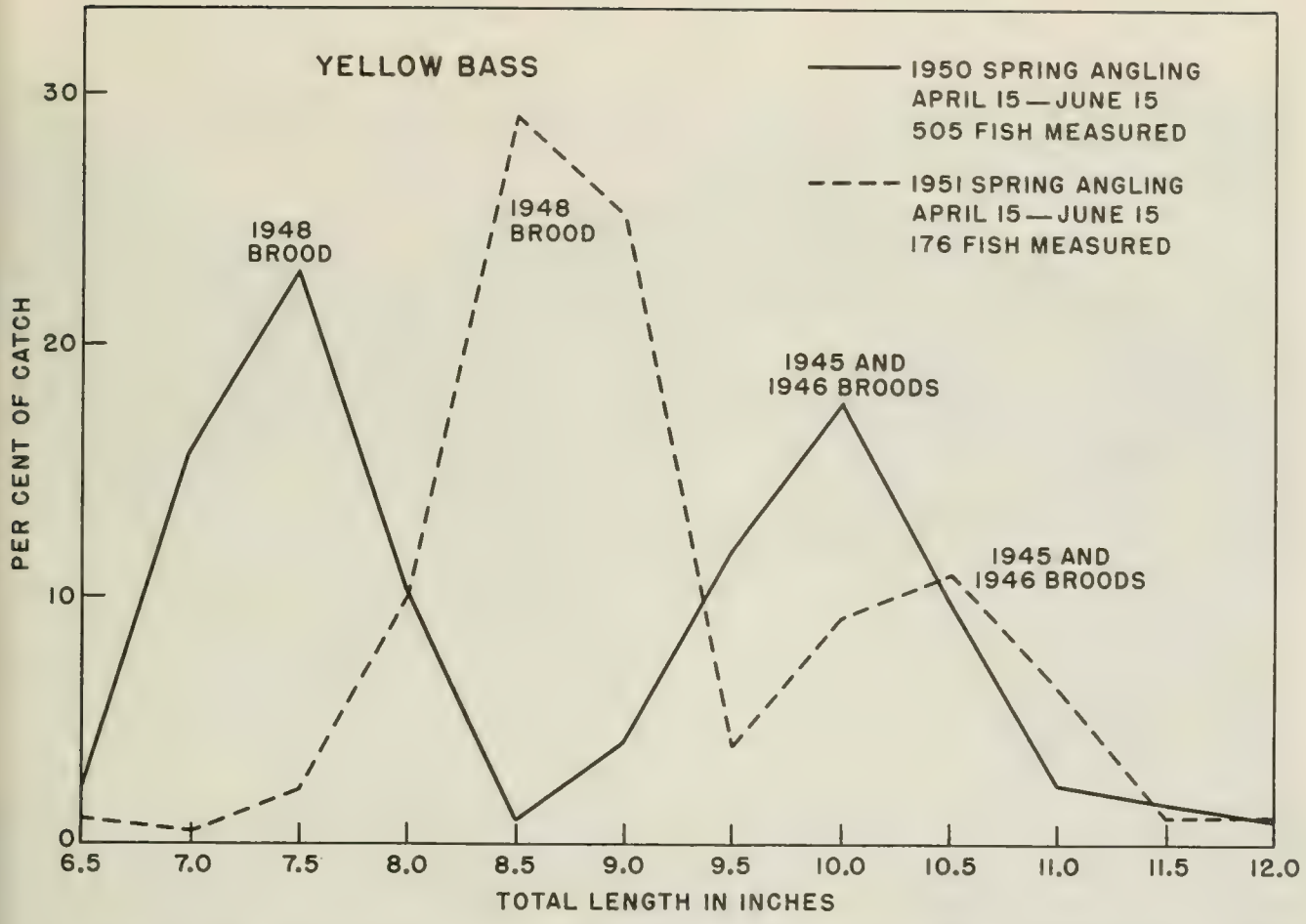


Fig. 19. -- Size distribution of yellow bass caught by anglers at Lake Chautauqua in the spring months of 1950 and 1951.

In 1950, only 20 white bass were caught at Lake Chautauqua and, of these, 14 were fish spawned in 1950. A total of 805 of these bass were caught at the lake in 1951. This number was more than 40 times the number caught in 1950. The catch in 1951 would have been 10 to 20 times as high had anglers followed a simple fishing technique.

This technique consists simply of taking advantage of the summer habit of the white bass of feeding in schools near the lake surface. When these bass are feeding the water "boils." In the summer of 1951 we noted that, in a body of water adjoining Lake Chautauqua, the "boils" frequently occurred from sunrise to 10 o'clock in the morning and from 3 in the afternoon until dark.

In the summer the fly-rod fisherman should try a flicker spinner baited with a small strip of pork rind or a small metal wobbler. He should cast the lure directly into the center of the "boil." Bait casters will find that smaller, bass-size, metal wobblers are very effective when cast into the "boil."

The "boils" were seldom seen in the fall and spring months. During these seasons, the white bass are feeding in deeper water, and the bait caster can often have good fishing success by casting a weighted metal wobbler over sand bars and other areas that he observed in the previous summer were being used as feeding grounds.

White bass will take small minnows and occasionally worms, particularly when fished in currents caused by high water.

The white bass is a fast-growing fish. At Lake Chautauqua, fish that were spawned in 1950 averaged 8 to 10 inches in length by the middle of July, 1951, and, by fall of that year, 10 to 12 inches.

Fishing for white bass should be good in 1952 and 1953. If the outcome of spawning is poor in 1952 and 1953, the fishery will decline by 1954, since the white bass is a short-lived fish and the older fish are very difficult for anglers to catch.

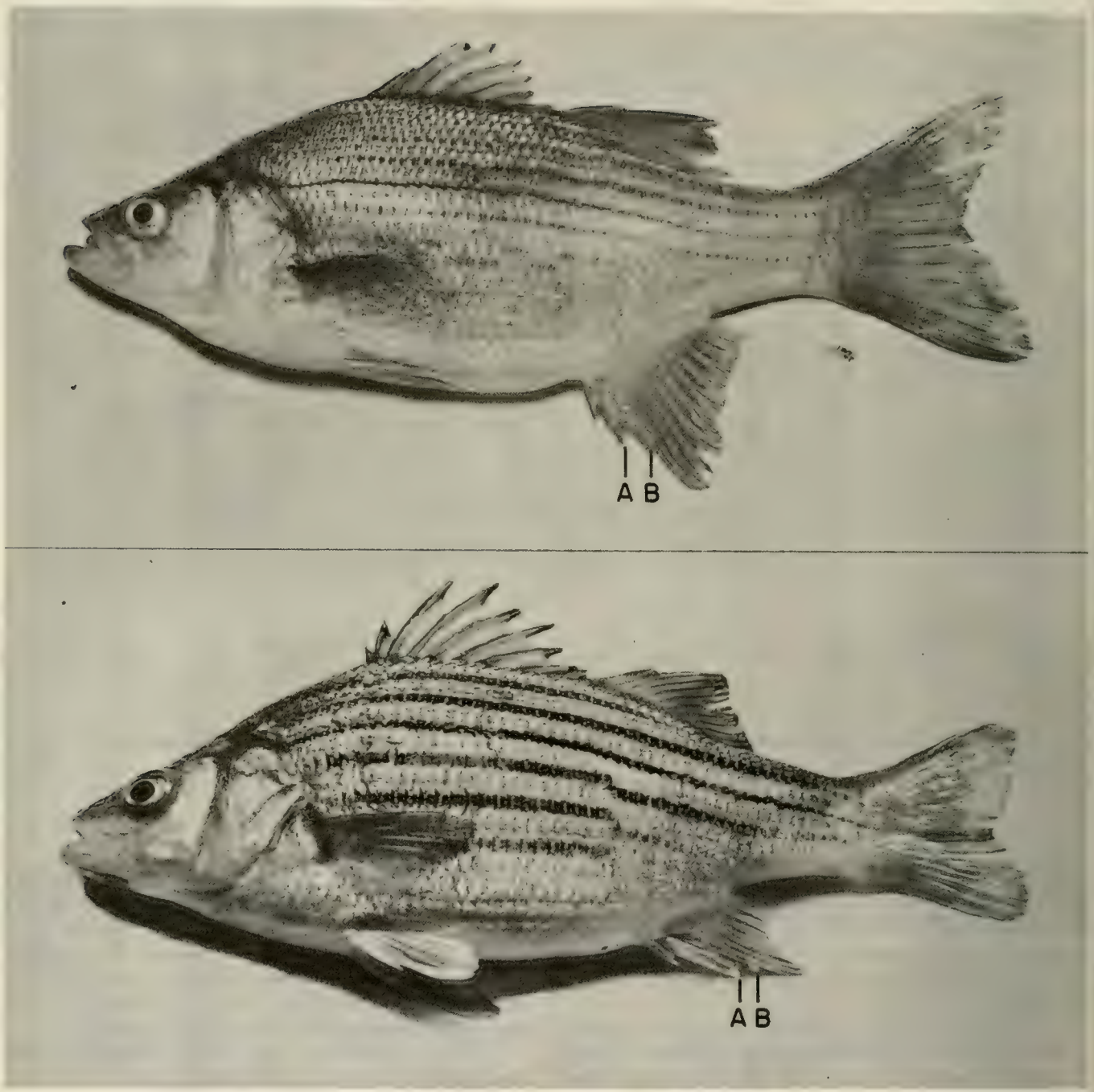


Fig. 20. -- White bass, above, and yellow bass, below. They may be distinguished by the following characters: The white bass is silvery in appearance, the yellow bass golden. The lines on the side of the white bass are rather faint but unbroken; on the yellow bass they are distinct but broken. On the white bass the lower jaw protrudes beyond the upper; on the yellow bass the lower jaw does not protrude beyond the upper when the jaws are closed. On the white bass, the third anal spine, B, is considerably longer than the second, A; on the yellow bass, the third anal spine, B, is approximately equal to the second, A.

Anglers should fish hard for white bass in 1952 and 1953 in order to take advantage of the 1950 and 1951 age groups, still abundant in the lake.

Largemouth Black Bass

All black bass reported caught by anglers at Lake Chautauqua in 1950 and 1951 were largemouths, except one, a smallmouth.

Successful black bass fishermen at Lake Chautauqua use a stiff cane pole, heavy line, bobber, sinker, and a No. 1/0 or similar size bass hook. The hook is baited with a 5- to 8-inch chub minnow hooked through the lips. The chub is fished in the buckbrush, in smartweed beds, and around stumps in the manner described for crappie fishing in the buckbrush under the heading of white crappie. One of the more important aspects of successful fishing with chubs is to approach the area to be fished in a very quiet manner. A.T. Peara, fig. 21, one of the successful fishermen at Lake Chautauqua, says, "You have to sneak up on them."

A stiff cane pole and heavy line are a necessity to "horse" a bass out of the brush. Often the angler will have to raise a 2- or 3-pound bass straight out of the water; otherwise, the bass will become entangled in the brush or will tear itself loose from the hook.

In 1950 and 1951 more largemouth bass were caught per fisherman-day when the water level either was falling or was at a low, stable stage, fig. 22, than when the water was rising or at a high stage.

Liberalized Bass Fishing

On an experimental basis, in both 1950 and 1951, fishing for largemouth bass was permitted at Lake Chautauqua during the period of April 16 through May 31, which is by state law a closed season on these bass in the Central Zone, in which Lake Chautauqua is located. Largemouth bass caught by anglers during this period were marked at the boat liveries with metal seal tags. These tags were placed on the fish for the protection of each angler in the event his catch was examined later by a conservation officer.

In the normally closed season in 1950, Lake

Fig. 21. -- A string of largemouth black bass caught and displayed by A. T. Peara of Havana in the summer of 1950. These bass were taken at Lake Chautauqua with cane pole, line, and hook baited with large, live chubs. Photo by J. B. Stall of the Illinois Water Survey.

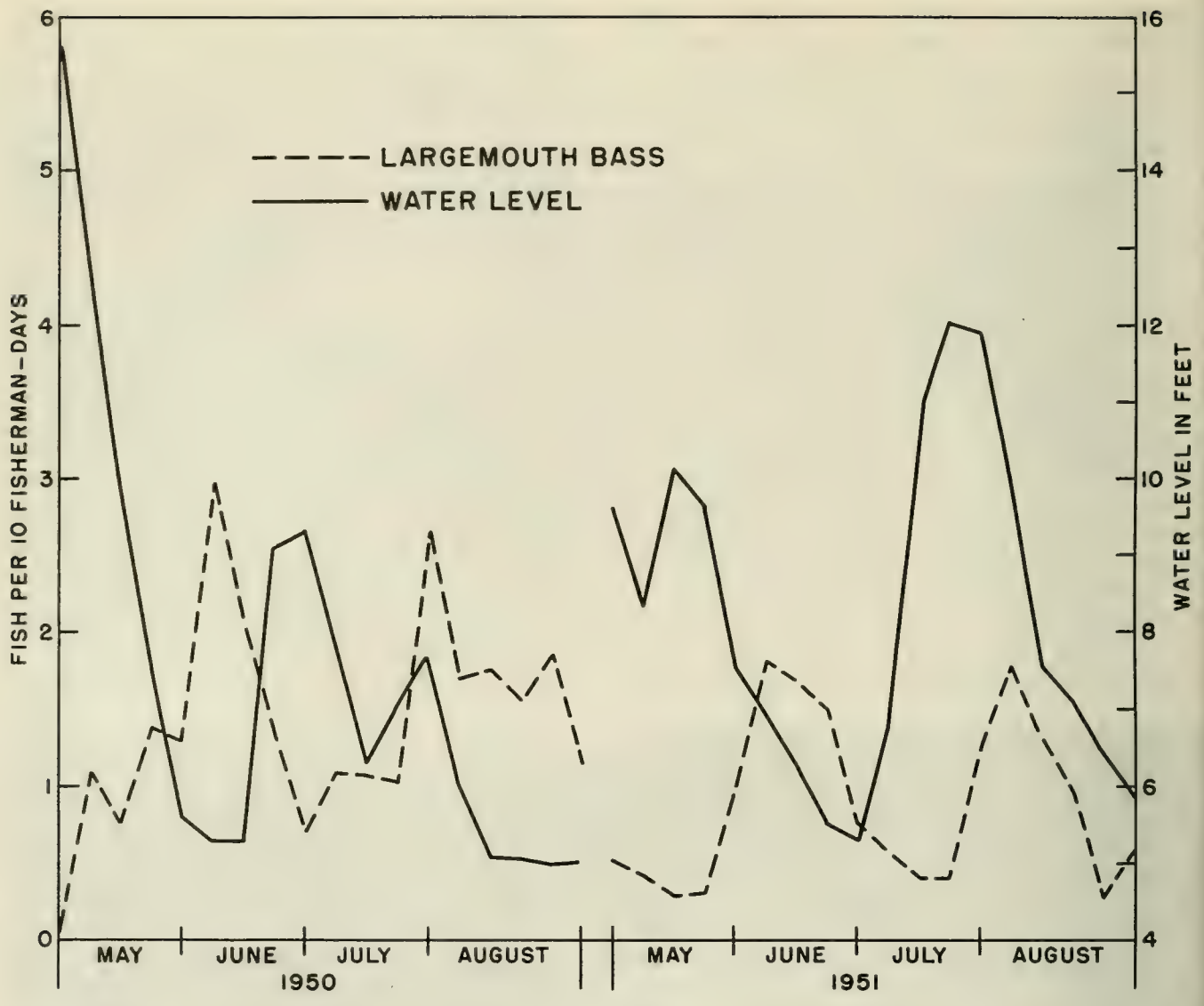


Fig. 22. -- Weekly average water levels and corresponding average catches of largemouth bass per 10 fisherman-days at Lake Chautauqua in the late spring and summer months of 1950 and 1951. Bass fishing was best when the water level either was falling or was at a low, stable stage.

Table 4. -- Number of largemouth bass caught by anglers at Lake Chautauqua, 1950 and 1951, during the normally closed season of April 16 - May 31 and during the remainder of the year.

Year	Bass Taken April 16-May 31	Per Cent of Total Number for Year	Bass Taken Remainder of Year	Total Bass Taken
1950 (10 inches or over)	295	21.9	1,052	1,347
1951 (all sizes)	191	17.3	913	1,104

Chautauqua anglers caught 295 largemouth bass (10 inches or longer), representing 21.9 per cent of the total 1950 catch of this species at the lake, table 4. During the normally closed period in 1951, anglers caught 191 bass (all sizes), equal to 17.3 per cent of the catch of bass for 1951.

No actual observations of nesting bass were made in 1950 or 1951. On June 23, 1950, we took (in two hauls with a 20-foot minnow seine) 65 young bass ranging in total length from 1.1 to 1.6 inches. These, and additional catches of young bass taken later in summer, furnished evidence that bass had spawned with some degree of success, even though fishing was not restricted during the spawning season. Little evidence was found that bass produced a successful spawn in 1951, and in that year only 191 bass were removed by anglers during the April 16 through May 31 period. Evidently some factor other than fishing affected the success of bass spawning in 1951. Murphy (1950) concluded from his studies in California that a closure of fishing during the spawning season of the largemouth bass did not increase the production of fingerling bass.

Bennett (1951) found that where bass were given complete protection from fishermen during spawning, the numbers of bass fry surviving to the schooling stage varied inversely with the numbers of yearling bluegills present.

In the spring of 1951 the 10-inch limit on largemouth bass was removed at Lake Chautauqua. Boat liverymen were furnished fish-measuring boards bearing a mark at 10 inches. They recorded on each angler's fishing permit, fig. 3, whether the bass taken were less than 10 inches or were 10 inches or longer. Of 737 bass measured in 1951, only 33.4 per cent were less than 10 inches. Length measurements made on bass caught by anglers in 1950 indicated that 8.2 per cent of the fish were under 10 inches, even though the size-limit restriction was in force. In 1951, some anglers were hesitant about keeping bass under 10 inches in length, even though signs had been posted at the boat yards advising that it was legal at Lake Chautauqua to keep bass of all sizes. Perhaps in the future more bass under 10 inches will be kept by anglers, as the 1951 legislature removed the size-limit restriction from the Fish Code.

Discussion

The anglers' catches at Lake Chautauqua in 1950 and 1951, table 2, demonstrate that satisfactory sport fishing may be found in the Illinois River valley for thousands of anglers. The Lake Chautauqua area, once a series of bottomland sloughs, then a drainage district surrounded by levees, is again a lake producing aquatic rather than terrestrial crops.

Studies at Lake Chautauqua indicate that large populations of certain kinds of sport fishes are not harvested by anglers and that most of these fish die of old age. The sport-fish harvest would be greater if more anglers knew how to fish the lake.

Anglers can enjoy good fishing at Lake Chautauqua by using tackle and fishing techniques that have been proved by experience. For example, artificial lures usually are ineffectual for taking the largemouth bass at Lake Chautauqua, but a cane pole and a hook baited with a large, live chub minnow takes this species quite readily.

Every angler at Lake Chautauqua should talk over fishing conditions and methods with the liveryman from whom he rents a boat. The boat-yard liveryman is one person who usually knows what kind of fish are biting, the kind of bait to use, and where an angler is most likely to catch fish.

The Lake Chautauqua angler who specializes in fishing for only one kind of fish may make poor catches during certain years because of a temporary reduction in the abundance of that species.

The perennially successful angler is the one who fishes for species that are abundant and are biting well. He knows that, even though a species is abundant in the lake, there is little use to fish for it under certain conditions. Some abundant species are difficult to catch except during their spawning periods, or at certain water stages or changes in levels, or at certain seasons of the year.

Summary

1. Lake Chautauqua is a reflooded drainage district in the flood plain of the Illinois River near Havana. It is being studied to discover the values of the sport and commercial fisheries of a bottomland lake and the factors controlling these values.

2. Since the flood of 1943, the lake has been more turbid and has contained less aquatic vegetation than for several years previous. In 1950 a silt survey indicated that the storage capacity of Lake Chautauqua had been reduced 18.3 per cent by sedimentation in approximately 24 years.

3. A creel census made at Lake Chautauqua between April 15, 1950, and October 25, 1951, showed that anglers caught 36,822 fish in 1950 and 56,289 in 1951. Anglers' catches included 25 different kinds of fishes.

4. Composition of the anglers' catches had changed since 1941 and 1942, when the bluegill and the yellow perch predominated in the catches. In 1950 and 1951, the white crappie, the freshwater drum, and the bluegill predominated.

5. The success of fishing at Lake Chautauqua was affected by fluctuations in water levels, by seasons, and by changes in the relative abundance of the various species of fishes.

6. Two years of creel censusing showed that a larger harvest of sport fishes would have been made if more anglers had known how to fish the lake.

7. Instruction in methods of still fishing with cane poles and live bait is a form of fishery management recommended for the lake. Instruction was given in fishing techniques suitable for the common species of fishes.

8. The white crappie population in 1950 and 1951 was dominated by the 1948 brood or year-class. In the fall of 1950, individuals of this year-class reached a size large enough to furnish good fishing, and they continued to furnish good fishing through 1951. The white crappie is a short-lived fish and possibly the 1948 brood will be greatly reduced by 1953. The majority of the 1948 brood will be lost to anglers through natural mortality. With the reduction of the 1948 year-class, white crappie fishing in the lake will decline until a new large brood is spawned.

9. Whenever the white crappie population is low or is not biting, anglers should fish for black crappies in the buckbrush.

10. In 1950 and 1951, bluegill fishing at Lake Chautauqua was best during the late spring and summer months.

11. The yellow perch fishery at Lake Chautauqua declined in the decade ending in 1950. This decline may have been related to the virtual disappearance of aquatic plants from the lake following 1943.

12. Channel catfish and freshwater drum bit best in 1950 and 1951 when the water level was rising or was at a high stage.

13. Yellow bass were caught in much greater numbers in 1950 than in 1951. The best catches of yellow bass in these years were made in late April and early May.

14. White bass recently became abundant enough in Lake Chautauqua to furnish good fishing. These fish are short-lived, and anglers should fish for them while they are abundant.

15. A still-fishing rig baited with large chubs was a successful tackle for largemouth bass at Lake Chautauqua in 1950 and 1951.

16. Seasonal restrictions on largemouth bass were set aside at Lake Chautauqua in 1950 and 1951 and length restrictions in 1951. In 1950 and 1951, the largemouth bass removed by anglers during the normally closed spring season amounted to 19.8 per cent of the 2 years' total catch of these bass. In 1951, bass under 10 inches in length represented approximately 33 per cent of the catch of bass of all sizes.

17. Bottomland lakes of the Illinois River valley, as demonstrated at Lake Chautauqua, provide good fishing waters for thousands of anglers.

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